Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

Vol. 246. 97th Year. LONDON, JULY 18, 1945. Registered as a Newspaper. No. 4287. Price 1/-

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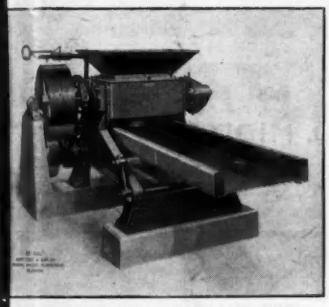
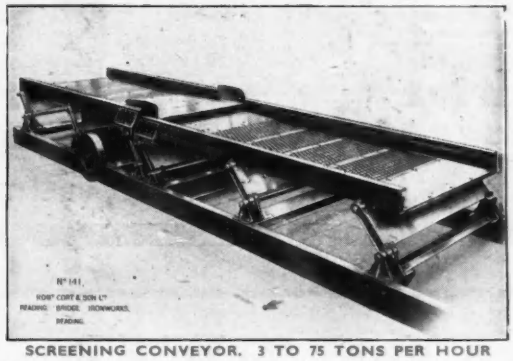
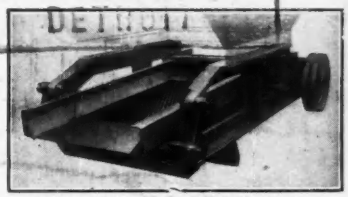


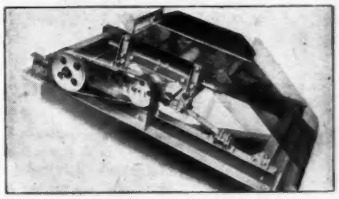
COKE CUTTING MACHINE WITH RECIPROCATING SCREEN



SCREENING CONVEYOR. 3 TO 75 TONS PER HOUR



RECIPROCATING DEBREEZING SCREEN



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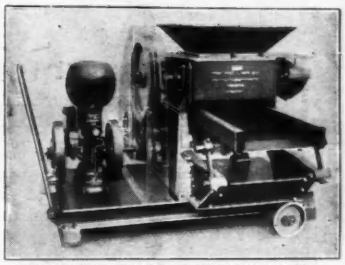
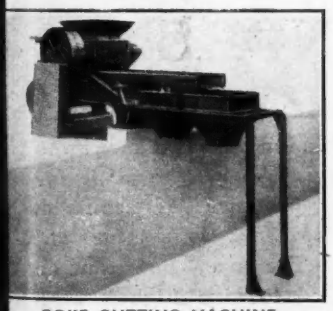


PORTABLE COKE CUTTING AND SCREENING UNIT



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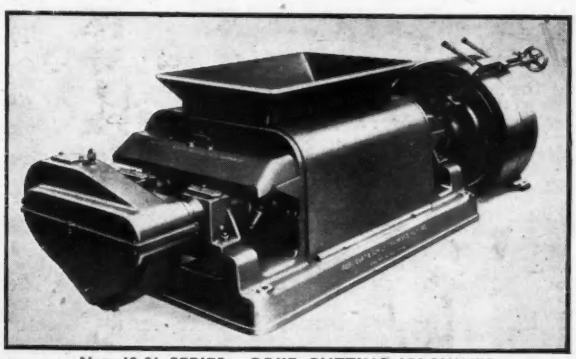

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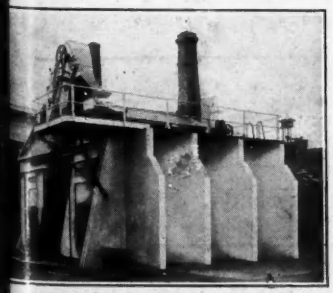

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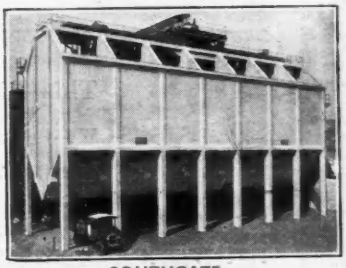

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The illustration shows part of a Battery of 16 'A.C.E.' Screening Units arranged in pairs with common hoppers. Those in the foreground being of the continuous running class, while the four in the background being equipped for weighing and bagging.

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GAS SERVICE GOVERNORS

This is an angle type Governor, with horizontal inlet and bottom outlet. Can be supplied with ¾" or 1" inlet and the outlet fitted with union and nut suitable for connecting to the inlet of a meter with either 5- or 10-light bosses.

Suitable for Inlet Pressure up to 22" w.g., but can be made for higher pressures if required. The Governor is set for 2·8" Outlet Pressure, but can be weighted to give higher pressures if desired. Capacity—300 cu. ft. per hr., with a pressure loss of less than ½" w.g.

This Diaphragm Governor has been developed to meet conditions which will be generally found in the new houses now being erected. :: Many thousands have been delivered already.

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Gas Works Plant Engineers, CHESTERFIELD

GAS JOURNAL, JULY 18, 1945
VOL. 246 97th YEAR No. 4287

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THE SOCIETY OF BRITISH GAS INDUSTRIES 1905

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in Parkerizing and Bonderizing
ARE SIGNIFICANT

Pyrene Metal Surface Treatment Processes made their initial appearance in the nineteen-twenties when Parkerizing was introduced. Since then the following significant advancements have been made:—

1931 "BONDERIZING" for Paint Anchorage.

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1938 "PYROGRIP" Cold cement for dressing mops and bobs used for scurfing and polishing.

1939 "PARKERIZING" for Lubrication.

1942 "BONDERITE" 'K' for treatment of continuous steel strip and sheet production.

Other war developments which have taken place are, at present, available only to Government Factories and Contractors.

IT CANNOT BE PARKERIZED (Registered) OR BONDERIZED (Registered)

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The Pyrene Company Limited · Metal Finishing Division · Great West Road, Brentford, Middx.

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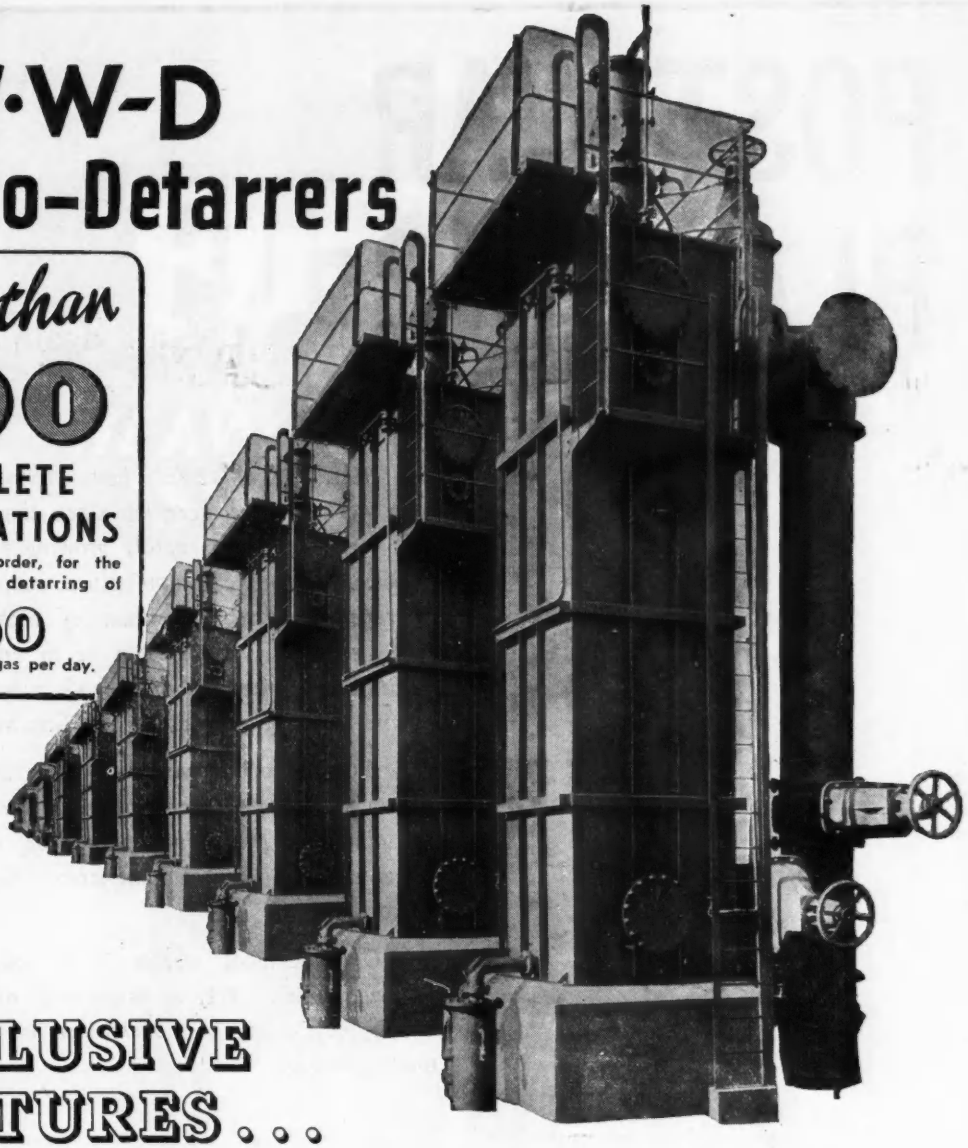
More than **100** COMPLETE INSTALLATIONS supplied or on order, for the high efficiency detarring of **660** million cu. ft. of gas per day.



EXCLUSIVE FEATURES . . .

1 The gas treater discharge electrode wires are prevented from developing pendulum swing by employment of a specially designed central electrode suspended from a W.W-D type moulded Vitreosil insulator, readily accessible for cleaning. This system is covered by Whessoe Patent B.P. 428,471.

127 W·W-D Electro-Detarrer gas treaters supplied or on order all incorporating this design.

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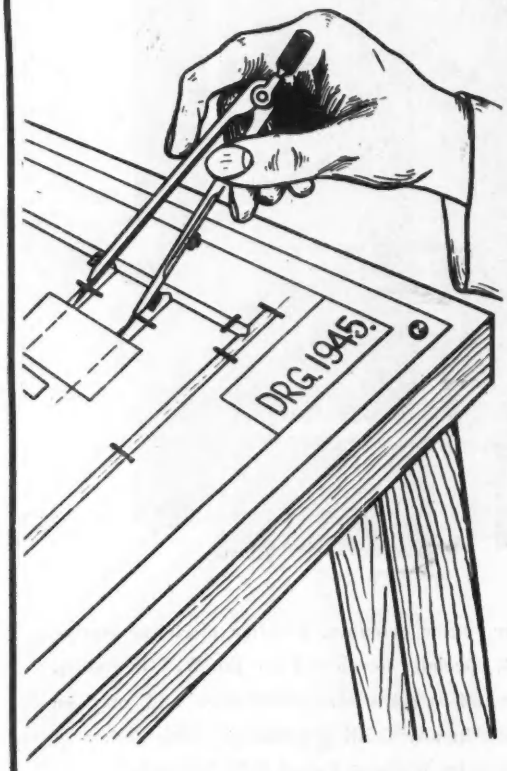

BALFOUR of LEVEN have planned for post-war work on each occasion since the Napoleonic Wars, but now our rapidly growing facilities for modern methods of manufacture, coupled with an increase and reorganisation of technical staff and research facilities, put us in an unrivalled position to market the most modern type of plant to meet the new needs of the Gas Industry.

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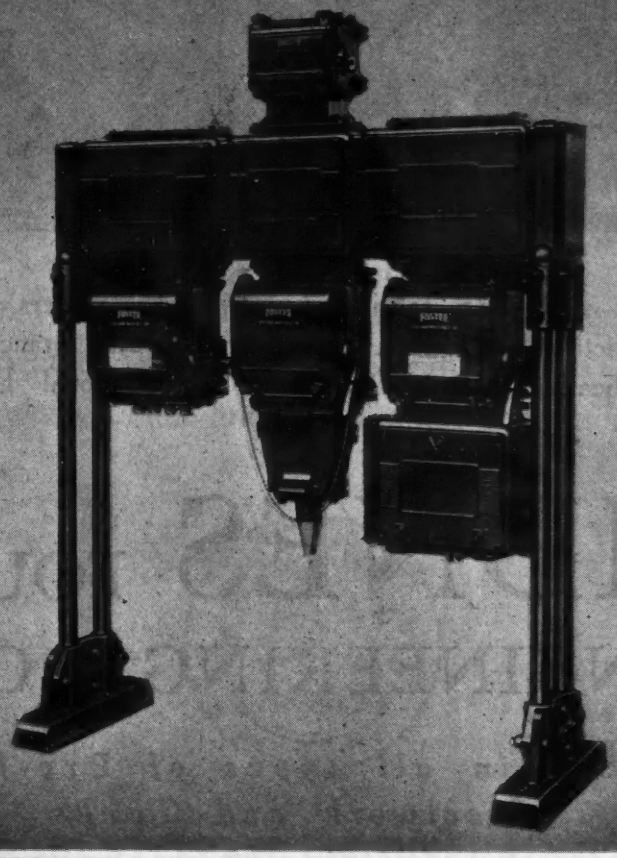

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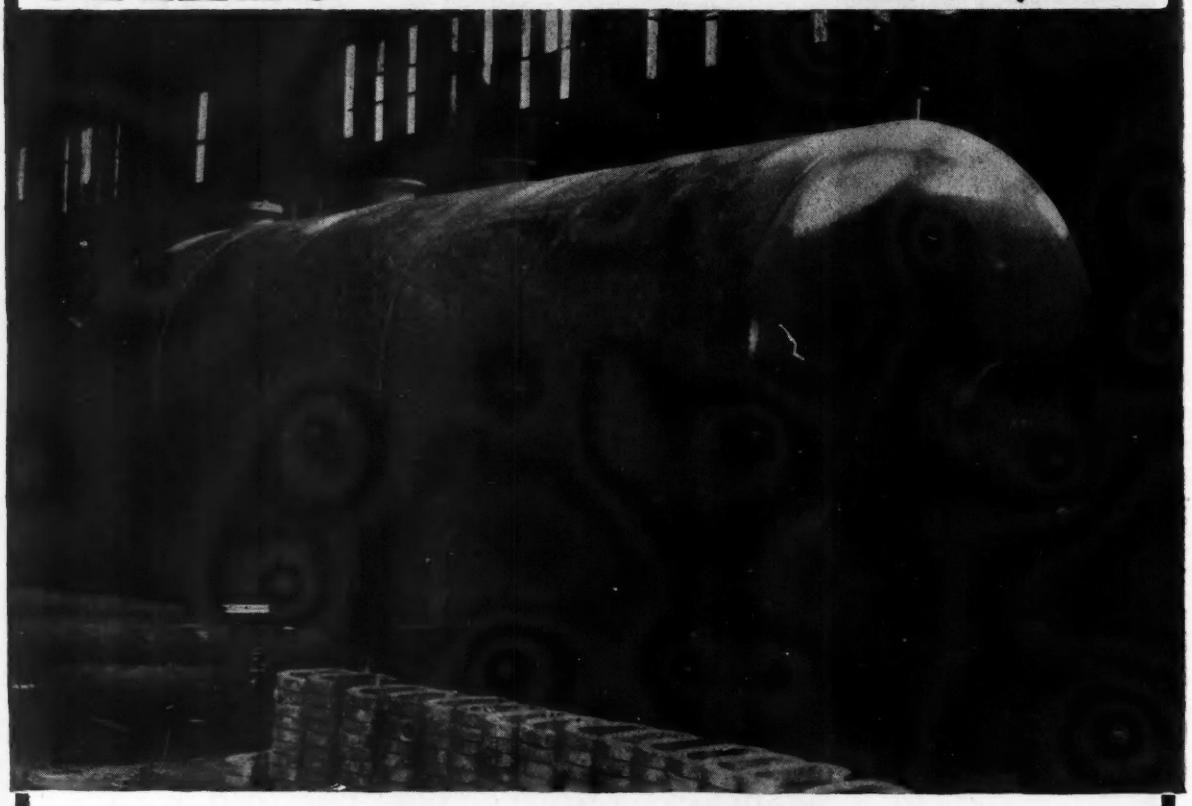

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Lubrication visually checked. *Complete freedom from sticking or seizing.* Film of insoluble plastic lubricant seals all possible leakage-points; acts as coating against corrosion or abrasion	Plug designed to be self-sealing with metal-to-metal joint at the head. No gland to pack. *Maintenance needs reduced to a sheer minimum*	Truly parallel plug, *always lubricated and in perfect contact with seating surfaces.* Eliminates jamming; ensures complete and continuous ease of operation, with bare minimum of wear

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The Valves of Virtues

for water, hydrocarbons, alkalis, acids, gases and for pressures up to 4,000 lbs. per sq. inch

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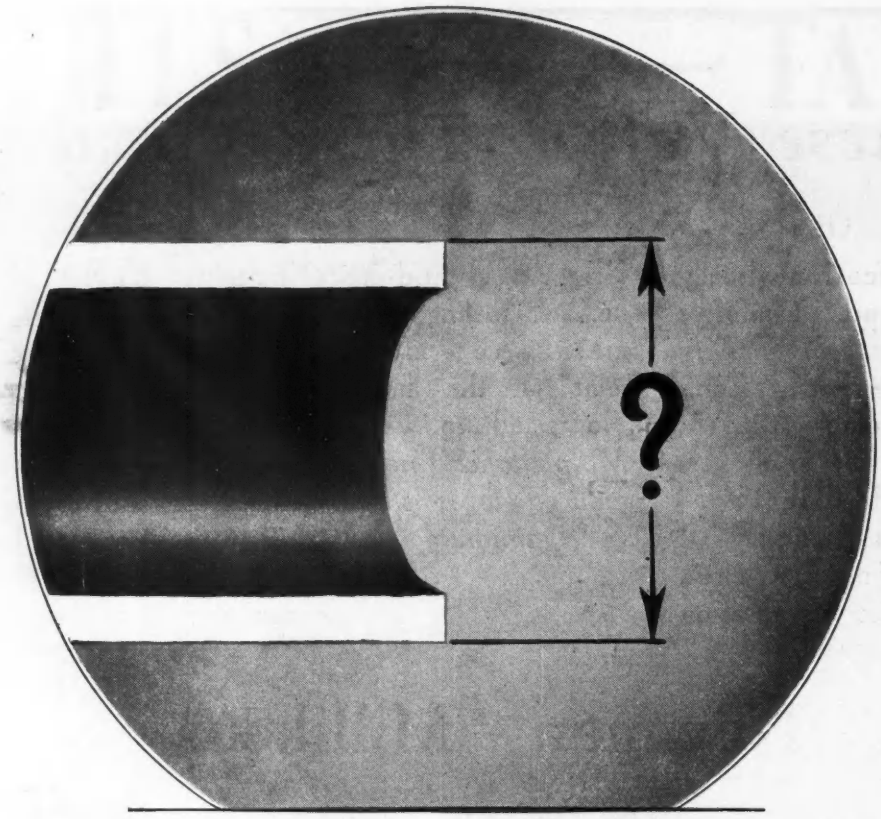

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demand the maximum output of steel tubes, which is made possible only by manufacturing each size in large quantities.

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We offer our full collaboration with your engineers in the choice of tubes, preferably at an early stage of design.

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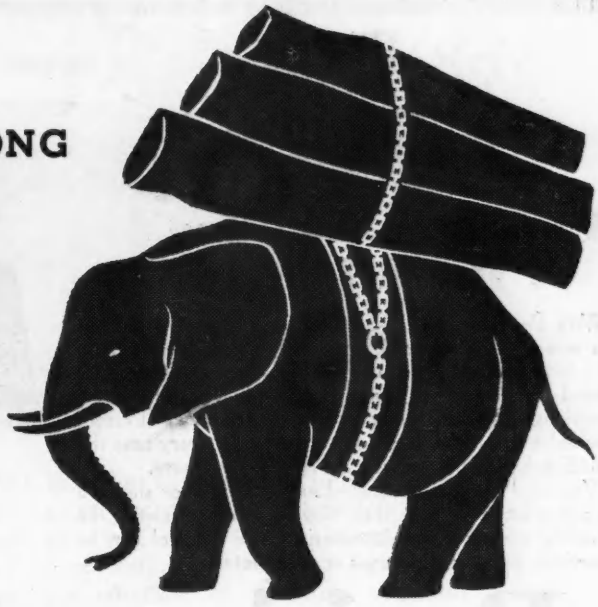
S&L

Full lists of standard sizes, limits and qualities will be sent on application.

THE STRONGEST OF THE STRONG



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FOR BUS STARTING AND LIGHTING, DIESEL LOCOS AND RAIL CARS, TROLLEY BUSES AND ROAD TRANSPORT VEHICLES OF ALL KINDS

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HIGH PRESSURE SERVICE GOVERNORS

Inlet Pressures, 1-75 lb. per sq. in.
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Speaking of pressing a button and getting the work done! Into the air and along it goes—just as easy as that. Three models available: ranging in capacity from 5 cwt. to 10 tons, all built for continuous heavy duty. Overhead runways erected if required.

Write for booklet on Lifting & Shifting

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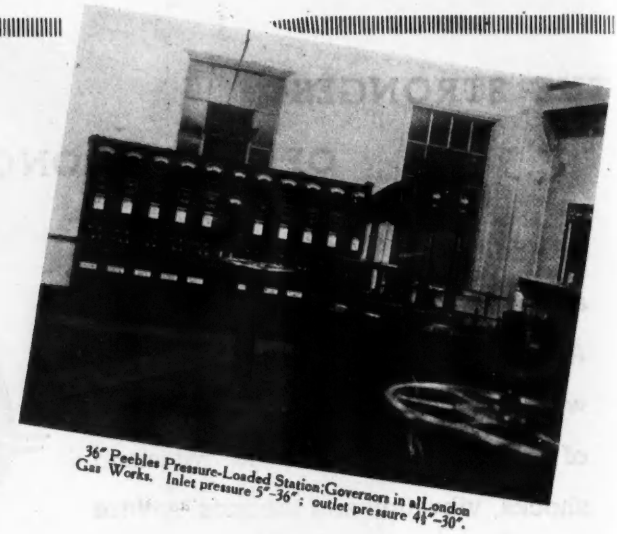
HITCHIN 960 (10 lines) | MANCHESTER CENTRAL 1947 | NEWCASTLE 24198 | GLASGOW DOUGLAS 2798

Pressure Loading *v.* Hand Loading

With Peebles Pressure-Loaded Station Governors there is none of the arduous work inseparable from weight-loaded governors operating at high pressures. With a hand-weight loaded governor of the 36″ size illustrated, working with 30″ outlet pressure, weights of 15 cwt. would need to be taken off, or replaced, every time the loading had to be changed, to 4½″ night pressure.
With the Peebles Pressure-Loaded Governor shown a small pilot governor with tiny weights regulates the loading pressure: or Automatic Clock Control can be used to make these changes at stated intervals.



36″ Peebles Pressure-Loaded Station Governors in all London Gas Works. Inlet pressure 5″–36″; outlet pressure 4½″–30″.

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PRESSURE-LOADED STATION GOVERNORS

Ask us to tell you of Gas Works where these governors are giving great satisfaction. Give us data of governors needed.

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High resistance to abrasion
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True to shape and size
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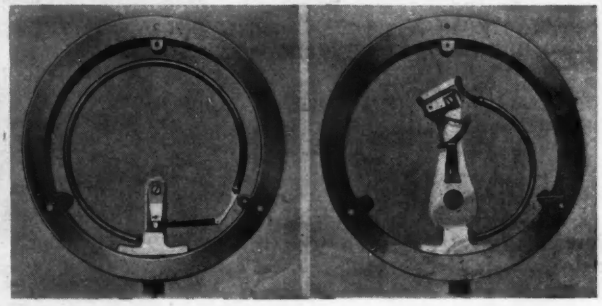
NOTABLE DEVELOPMENTS IN ENGINEERING HISTORY, 4

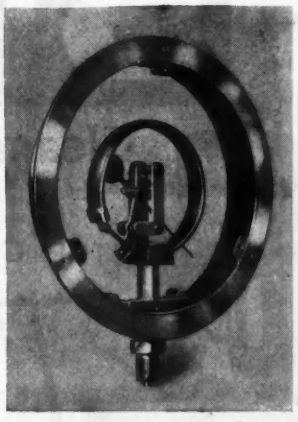
1850

BOURDON'S PATENT



THE mercurial column was one of the earliest methods adopted for measuring pressures, but with the advent of the locomotive, this arrangement was of necessity replaced by several of the improved pressure-measuring devices that were subsequently developed. These were chiefly dependent upon pressure-responsive elements in the form of diaphragms, flexible bellows and Bourdon tubes. Many of these developments were the subject of patent specifications, one of the outstanding being the patent filed in 1849 by the Frenchman, Eugène Bourdon. The patent was officially described as "Instrument for Measuring, Indicating and Regulating the Pressures and Temperature of Air, Steam and other Fluids, and for obtaining from them Motive Power."

By 1850 John Dewrance senior had promptly obtained for Dewrance & Co. a licence for the sole English rights of Bourdon's patent for the manufacture of Pressure Gauge Tubes.



Bourdon's invention proved a reliable means of controlling steam pressures, the principle of which has remained, and is now almost universally adopted in the construction of pressure, vacuum and hydraulic gauges.

It must be acknowledged that John Dewrance senior was not only a shrewd and enterprising business man, but an Engineer to whom British Engineering is much indebted for his remarkable insight and pioneering spirit.

The introduction of Babbitt's Anti-friction alloys into this country, together with the manufacture of Bourdon type gauges, were contributary factors in Dewrance & Co. becoming firmly established as specialists in this class of business.

Two examples of the Bourdon type gauge of early design are shown above, while the lower illustration represents the improved internal construction of Dewrance Pressure Gauges as now supplied, with plastic or polished brass cases.

DEWRANCE
Established 1844 *& Co. Ltd.*

PIONEERS & SPECIALISTS IN PATENT VALVES & BOILER MOUNTINGS

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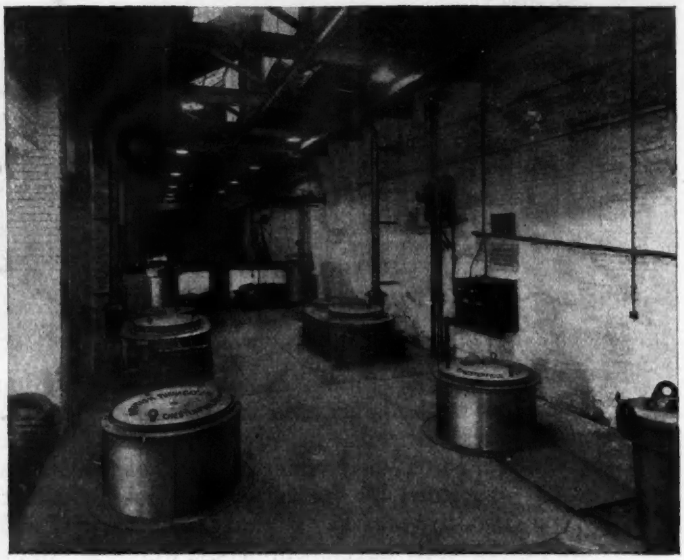
WIRE ANNEALING

THE illustration indicates a typical lay-out of two units of pot type annealing furnaces as supplied to a number of important Wire Manufacturers.

Each unit comprises preheat and heating chambers followed by a cooling chamber.

Units can be supplied to suit requirements with regard to pot size and capacity, but usual charge is 10 cwt. per pot.



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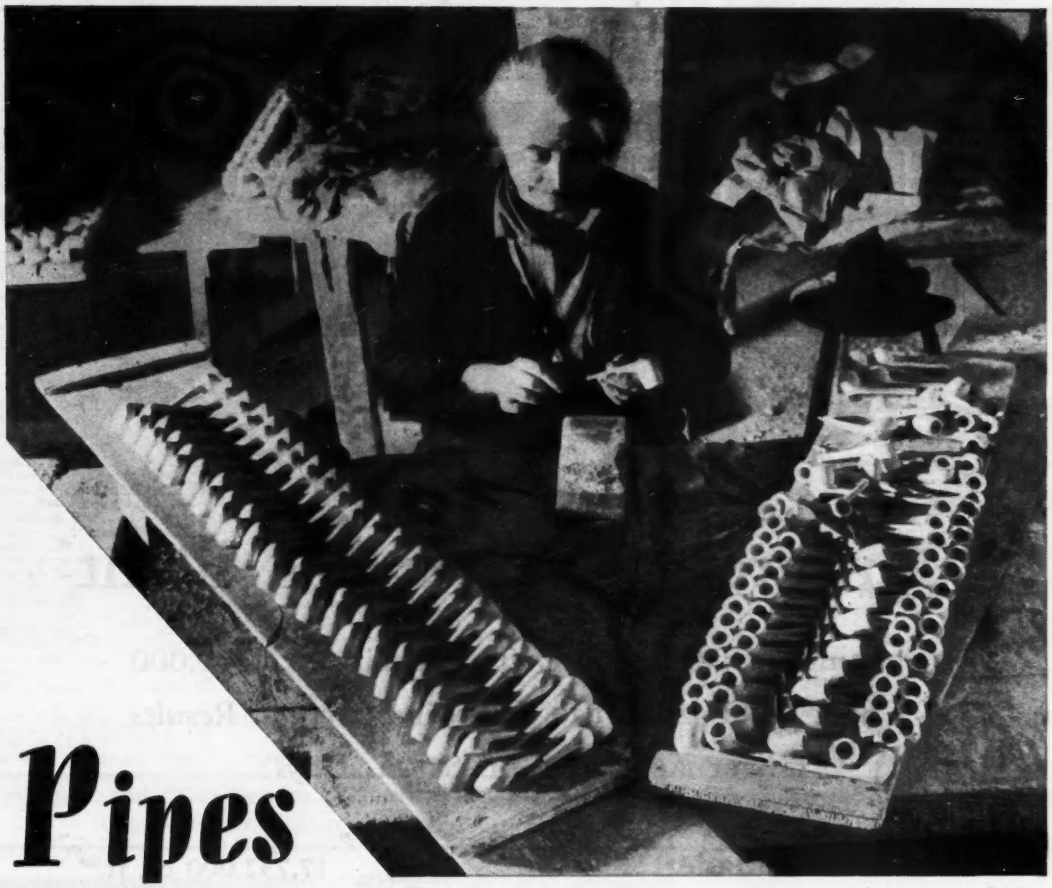

Pipes

IT WAS FROM THIS 150 years old Glasgow pipe factory that Thomas Carlyle bought his pipes at 3/6 a gross! But possibly you are more interested in pipes of another sort—those through which gas is distributed. In that case you will also be interested in Crane Pipe fittings, which ensure stronger and more reliable pipelines.

The TAPER-TO-TAPER THREADS of Crane Fittings, by making solid metal-to-metal contact throughout their entire length, ensure stronger joints free from corrosion.

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A "Labourless" Carburetted-Water-Gas Plant

having a Guaranteed Daily Capacity of 2,300,000 Cubic Feet gave the following *Actual Results* over a period of *Seven Days*:

Total Gas Made	**17,732,000** cu. ft.
Daily Rate of gas production	**2,535,000** cu. ft.
Calorific Value of gas	**503·5** B.Th.U.
Waste Heat Steam Produced per 1,000 cu. ft.	**57·1** lb.
Oil used per 1,000 cu. ft.	**2·0** gall.
Dry Coke charged into generator per 1,000 cu. ft.	**27·1** lb.
Carbon consumed in generator per 1,000 cu. ft.	**22·9** lb.

H. & G. Water-Gas Plants range in Unit Capacity from 80,000 to 9,000,000 cu. ft. Daily.

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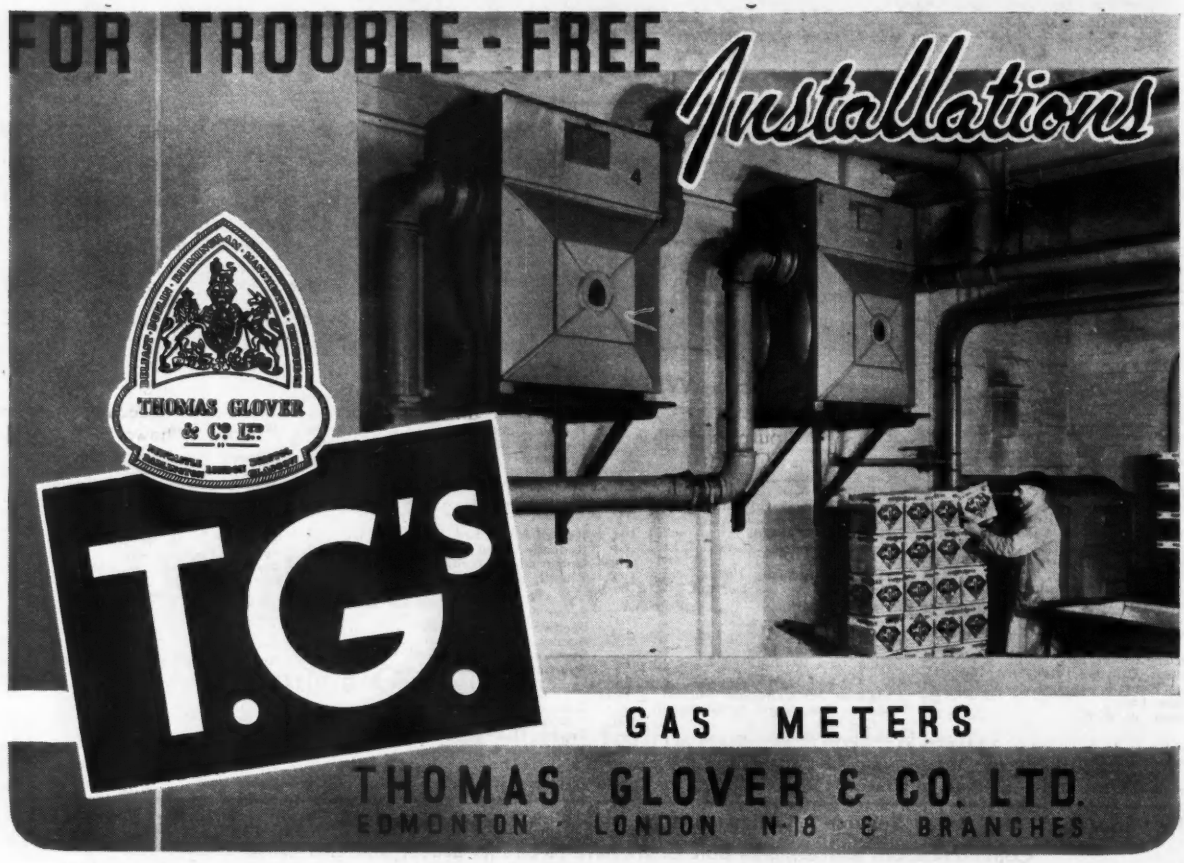
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GAS JOURNAL, JULY 18, 1945

VOL. 246 97th YEAR No. 4287

EDITORIAL NOTES

THE SECOND PHASE

THE second phase in the internal reorganization of the Gas Industry opened auspiciously last week when the British Gas Council held its first meeting since the parent bodies formally committed to it the discharge of their combined work and objects. In the matter of unity and the desire to work together it was an enheartening meeting, the main purpose of which, after the re-election of Mr. A. E. Sylvester as Chairman, was to explore the problems involved in appointing an Executive Board whose composition would be generally acceptable. Since the executives of the National Gas Council and the British Commercial Gas Association agreed to unite as the British Gas Council, a dozen members, ten of whom formed the committee which effected the original link-up, have acted temporarily—and well—as an Executive Board. Until the parents met last month and constitutionally sanctioned the "marriage" the whole thing was necessarily on a temporary basis, and obviously the first move now that it has taken permanent shape is to create a "Cabinet" which shall have the confidence of the entire Industry.

Should it be a small body appointed by the Council without reference to the Districts, or should the Districts make their own nominations without regard to the relative qualifications of people who happen to be outside their boundaries? Both points of view were, as reported in a later page, "fully and openly" discussed, and the division of opinion was so nearly equal that it was clearly the wish of the meeting that there should be a compromise. A postal ballot is therefore now being taken for the election of 12 members, and if, when the votes are counted, any Districts remain unrepresented, it will be open to the Council members representing each of such Districts to nominate one of their own number for election *by the Council* to the Executive Board. The italics are ours, in emphasis of the fact that the Executive Board will owe allegiance to the Council, and that District representation will be of secondary importance. The ballot papers have to be returned by July 24, and so, within a day or two of the declaration of the General Election result, the Gas Industry will also know the names of at any rate the majority of its own ruling authority.

In this second phase of the transition the British Gas Council will be able to work out many problems with which it has not been practicable for it to deal during the temporary stage, but more remains to be done before it takes final shape. It must have a constitution of its own, so that the parent bodies may be reverently and decently interred. From our detached standpoint we are glad that it has not rushed into what could have been nothing more than a "paper" constitution, but has decided to try out a number of problems while it is still in its present shape, and thus be in a better position to know the sort of constitution it really wants. We are not unmindful of the fact that on more than one occasion we have urged more speed in completing the reorganization, but constitutions are not easily amended when once adopted, and so long as the B.G.C. can get on with its job without hindrance, the precise wording of its constitution can well wait—for a time.

Among the larger questions which call for the Council's decision in the not too far distant future is that of the appointment of a Director and other new officials. In the temporary phase it would have been out of the question to find anyone of standing to undertake such responsibilities, but now that the Council is entering upon a more permanent life it may be expected to pursue this matter with considerable vigour.

TOWARDS MORE REACTIVE COKE

THE Papers read at the recent meeting of The Institution of Gas Engineers on the production at gas-works of coke for traction gas producers served to put on record the wartime work of the Gas Industry and others on a subject which in certain circumstances might have become an exceedingly important contribution to the war effort. Since, however, there was no interruption of our oil supplies the work proved to be primarily in the nature of an insurance against possible shortage. The cost of the fuel made to a specification satisfactory for traction gas producers is so high that it approximates to 10d. per equivalent gallon of petrol. The conclusion has been reached that at these prices producer gas would not find more than a limited use in peacetime transport, though the possibility of saving the importation of more than a million gallons of motor spirit through the operation of 100,000 heavy vehicles on producer gas might be worthy of more than passing consideration.

It is, however, reasonable to look further ahead than the comparatively narrow market of the traction gas producer. Can the technique, so far developed by the Gas Industry in a combined and co-operative effort, be used successfully to produce more reactive coke for general domestic purposes? At the outset it is well to make it clear that it is not yet certain that highly reactive coke is essential even if all the raw coal now burnt in the domestic grate were replaced by smokeless fuels. The new coke-burning grates are successful on gas coke as made, if not to-day, at least if made from coals of reasonable quality, that on the face of it, it hardly seems necessary to go to great lengths to make specially reactive coke for this purpose. There is, however, every justification for improving the reactivity of coke—perhaps to a maximum C.A.B. figure of about 0.05. A slightly more reactive coke than that commonly made in the continuous vertical retort will make the fire more lively, and will induce flames of burning carbon monoxide which in turn will give a more pleasing aspect to the coke fire. The fire will burn up more quickly, and generally speaking a moderate increase in combustibility or reactivity should make it more acceptable to the general domestic consumer for the open fire. From this aspect little need be done to improve the coke used in the closed stove, though the less reactive cokes sometimes give difficulty to those who have been accustomed to cokes which are more reactive.

The quantity of fuel that would be required to manufacture reactive cokes must be taken into account. It is not yet known whether the Government will, from somewhat clouded atmosphere, come down on the side of smoke abolition, though it seems likely that facilities will be afforded for smoke reduction. We are putting the prospects in this regard at their lowest. New houses are planned to be provided with facilities for burning smokeless fuels. It would appear that if smokeless fuels were burnt in modern high efficiency grates and the total quantity of coal carbonized were increased by some 20 million tons of coal per year, sufficient gas and coke would be provided to obviate the need for burning any raw bituminous coal in the domestic grate.

According to the figures published in the Institution Papers, however, the total amount of coal suitable for the manufacture of traction gas producer coke in the Gas Industry was 12.9 million tons in 1941, this being the production of high volatile coals of coking power C to G_2 as given in the Gray-King Assay. A good deal of this coal may be carbonized

already, and much of it may be large coal which would have to be crushed before carbonization, and which would be consequently more expensive than the general run of gas coal. No doubt it was necessary to use for the production of traction gas producer fuel a single coal which would give the required characteristics. Blends of coals would be more difficult to deal with. Mr. G. M. Gill demonstrated in his Paper to The Institution of Gas Engineers in 1944 that satisfactory cokes can be made by blending coking with non-coking coal, so that the estimate of the total amount of fuel available for traction gas producer coke manufactured bears no relation to the total quantity of highly reactive coke producible for all purposes. The researches described in the current Institution Paper might therefore be usefully supplemented by further researches on coal blending.

Specific attention must obviously be paid to costs. The costs of production of the gas producer coke were high, and amounted at Rochdale, where the coal cost 41s. 3d. a ton, to 69s. per ton net cost at works. The cost of coal is thus 60% of the total net cost, and whatever the method employed this figure cannot be greatly reduced unless the cost of coal is reduced. Another considerable item of cost was the production of 20% of breeze in the form of coke dust which had no value. When making reactive coke to a different specification for domestic purposes it would not, of course, be necessary to make anything like this quantity of breeze, and there would seem to be no reason why the percentage of breeze should be materially greater than it is in present practice. The rigid specifications for tar content also would be unnecessary, and this might improve retorting practice in the direction of reducing costs. It is important to notice that at Bradford and at Birmingham positive indications were obtained that coke with a C.A.B. value of 0.04 to 0.045 could be made with little sacrifice in gas yield. Further, since it is generally desirable to increase the throughput of a retort in order to improve the reactivity of the coke, the output in therms per retort may be slightly *increased* when making reactive coke.

Dr. King and Mr. Greenwood took the view that the work described in the Institution Papers should lead to the extension of the method of ordinary gas practice, and that the introduction of reactive cokes into a market already served by the combustion of unreactive coke in special appliances would be no serious inconvenience, provided these appliances give complete control over the supply of primary air. Our view would be that, while the present work has proved of immense value and has virtually solved the initial problems of the production of reactive coke at gas-works for traction gas producers, the work should be continued by the Gas Research Board, with special reference to the use of carbonizing plant less rigid from the standpoint of gas manufacture and more flexible from that of the manufacture of reactive coke in addition to gas. It is a question of method.

It would seem certain that the cost of highly reactive coke must always be greater, and may be considerably greater, than that of what we may term normal coke. The Birmingham experiments show that there is a reduction in gaseous therms from 80 to 60, in round figures, due to using low-rank coal and to medium temperatures. It would appear that the use of low rank coal at gas-works (though perhaps this does not apply to colliery-owned carbonizing plants) must be confined to blending with coking coals to produce the higher reactivity desired. Even so, there will be need for a higher price for the high-reactivity coke. It may well be suggested that the proper solution of this problem is to develop cheap and efficient coke-burning appliances which will take all the "normal" cokes without difficulty. But this conclusion may not be final, or even right. The various Authors would do the Industry a service if they would continue their investigations, and give us an authoritative statement on (*a*) the desirability or otherwise of manufacturing coke of 0.04 or 0.05 C.A.B., and (*b*) the economics of manufacturing each of these qualities of coke, as compared with normal practice.

Letters to the Editor

Co-partnership in Industry

DEAR SIR,—The Brighton, Hove, and Worthing Gas Company is sending to each of its employees in the Services a small booklet entitled "After Demobilization—Back to the Job again." Part of its object is to maintain and, if possible, to enhance the good relationship that exists between employers and employees.

There can be little doubt, I think, that we are in for very troublous times in the years ahead, and unless industry generally (*a*) appreciates the absolute necessity for harmonizing and identifying the interests and prosperity of labour with those of capital and management, and (*b*) is prepared to accept the responsibility for promoting within its own ranks an educative policy directed to this end, we shall have a struggle for power between capital and labour which will lead to disaster.

The Gas Industry is pre-eminent in its advocacy of the co-partnership principle. Yet even this is being undermined by the system of collectivism which Government policy and trade unionism are together forcing upon the country. The individual unit or entity is becoming lost, and pressure is being ruthlessly applied to prevent the expression of individualist opinion. If the Gas Industry is to remain healthy, it must refuse to accept the pernicious doctrine of "inevitability" and have the courage to stand firm for its convictions.

Having spoken on political platforms for five weeks during the election, I am shocked at the abysmal ignorance of the masses concerning the running of industry and the venom with which "Capital" is regarded. At the same time, I observed with interest that exposition in a clear and sincere manner of the ideal of a decent employer/employee relationship evoked a desire for further information—even in "Red" districts—and was not without effect on a considerable proportion of the audience.

I venture to hope, therefore, that the Gas Industry will do all in its power to ensure that this vital principle of identity of interest between shareholder, management and labour is made one of the principal features of its national publicity programme, linking it in positive terms with the accomplishments of free enterprise under Statutory (but not State) regulation.

5, Great Winchester Street,
London, E.C. 2.
July 11, 1945.

Yours faithfully,
HYDE C. BURTON.

Carbonization Reactions

SIR,—With reference to your Editorial of July 11, and Mr. T. Biddulph-Smith's Paper, it is gratifying to learn after a lapse of 20 years or so the Author has at last realized that his earlier contention as to the path of travel of the gases in a coke oven—that they took an inward and upward path—was unsound. He now grants that all products evolved at temperatures above 350°C. "must pass up through the solidified but porous mass of primary coke in zone B." Even now I do not think he means what he says. The gases evolved on the hot side of the plastic layer will take the line of least resistance, which will not be *up through the coke*, but outwards to the oven wall, and then up to the top of the oven. Later on he assumes that they take this path, because he says that the path may be only one inch.

He appears to claim priority for the suggestion of a central offtake, but as I have shown in *International Coal Carbonization* (Sir Isaac Pitman & Sons), pages 207 *et seq.*, the idea is quite ancient, as witness Rowan's patent No. 11581, 1890, Brunk, G. R. P. 51518, 1889, and other German patents; also Glover, West and Hargreaves, No. 106,189, 1916, and later Hird's patent, No. 263,686.

Hird used his central offtakes at low temperatures and completely avoided the cracking which the Author fears, yet he never obtained anything like 80 gall. of tar oil per ton of coal. His figures were nearer 18 to 25 gall., and only a small quantity of condensible oils was left in his semi-coke. Nor did Warner get very high yields of oil in his central offtake experiments ("GAS JOURNAL," Jan. 9, 1924). What he did show was that the coking time was reduced.

Finally, it will be news to many of your readers to learn that the various stages in the formation of coal are "from lignite *and cannel* to bituminous coal." He takes it for granted that we knew. We did not!

Oakfield,
The Park,
Cheltenham.
July 13, 1945.

Yours faithfully,
JOHN ROBERTS.

Diary

Aug. 2.—Institution of Gas Engineers: Gas Education Committee, 2 p.m., Gas Industry House.

Birlec, Ltd., have recently published an attractively produced brochure describing their Lectrodryer equipment for drying air and other gases. While most gas-drying problems are covered by the equipment described in the brochure, the Company is ready to co-operate with prospective users in the design of drying equipment to meet special requirements.

Personal

The Council of the Institute of Fuel has unanimously re-elected Dr. E. W. SMITH, C.B.E., as President for the year commencing next October. This will be Dr. Smith's third year of office. Mr. J. F. RONCA, O.B.E., has been unanimously elected Hon. Secretary of the Institute.

* * *

In succession to Mr. W. Young, Mr. H. H. BROWN, Assistant Engineer and Manager of the Batley Gas Department, has been appointed Engineer and Manager of the Stranraer Gas Company.

* * *

Mr. W. J. SMITH, M.B.E., is retiring from the Secretaryship of the Federation of Gas Employers after holding that office for 26 years. In accepting Mr. Smith's resignation, the Central Committee paid tribute to the splendid services he had rendered to the Federation ever since its inception, and expressed the wish that he would enjoy a long and happy retirement. The Committee has appointed Mr. C. M. PLOWMAN as Secretary of the Federation, and as Secretary of the Employers' side of the National Joint Industrial Council for the Gas Industry.

* * *

The Council of the Association of British Chemical Manufacturers has appointed Mr. J. DAVIDSON PRATT, O.B.E., previously General Manager and Secretary, as Director and Secretary. Mr. R. MURDIN DRAKE, O.B.E., and Mr. ALLAN J. HOLDEN, who during the last five years have been Assistant Managers, have been appointed Joint Managers of the Association.

British Gas Council

A meeting of the British Gas Council was held at Gas Industry House on July 10, when Mr. A. E. Sylvester was unanimously re-elected Chairman for the ensuing year. A list of the new Council was received.

The Chairman referred with deep regret to the death of Mr. Thomas Carmichael, who had served the Gas Industry for a very long period, and was respected and beloved by all his colleagues. He had been a great figure in the Industry, and his services had been greatly appreciated. Members stood in silence as a token of respect to his memory.

A recommendation was approved that the Executive Board, when elected, should consider the establishment at Gas Industry House of a Statistical Section.

It was unanimously agreed that Mr. F. C. Smith should be the Council's representative on the Illuminating Engineering Society in addition to Mr. Dean Chandler.

Following a full and open discussion as to the most satisfactory procedure to be adopted for the election of members to the Executive Board, it was unanimously agreed (1) That the Chairman of the Council be Chairman *ex-officio* of the Executive Board; (2) that a postal ballot be taken of all the members of the Council for the purpose of electing 12 of their number to be members of the Executive Board; and (3) that should the foregoing ballot result in any District being unrepresented on the Executive Board, the members of the Council representing each such District shall nominate one of their number for election by the Council to the Executive Board.

A recommendation from the Executive Board was approved for adoption—that the five members of the Gas Advisory Board should be members of the Executive Board and appointed by the Executive Board itself.

A report was made by Mr. C. H. Chester which showed the serious position in which many gas undertakings found themselves for lack of coal.

The Chairman reported on the deputation from the Council which had waited on the Minister of Fuel and Power on June 7, when they had pointed out to the Minister the danger of the Industry failing for the first time in its obligations to the community. The Minister promised to make the position clear to the public, should the serious coal position result in such a situation.

It was reported that the Urban District Councils Association had decided to draw the attention of their members to the scale of salaries recommended and approved by the National Gas Council in 1941.

The Council approved the nomination by the Association of Co-operative Tar Groups of Mr. C. M. D. Belton in place of Mr. A. W. Smith on the British Tar Confederation.

Strong dissatisfaction was expressed at the ruling given by the Government that members of gas repair gangs should not qualify for a Civil Defence Medal, and it was reported that the matter would probably be pursued further by the Conjoint Conference of Public Utility Undertakings.

The next meeting of the Council will be held on Sept. 11.

Presentation to Sir David Milne-Watson

Following the twenty-sixth annual general meeting of the National Joint Industrial Council for the Gas Industry at the Dorchester Hotel, on July 11, a luncheon was given in honour of Sir David Milne-Watson, who 12 months ago completed 25 years as Chairman of the Council.

Colonel H. C. SMITH, who presided at the luncheon, said how pleased the members were to see Sir David still taking a vital interest in their affairs. The way in which the meetings of the National Joint Industrial Council had been conducted during those 25 years had served as a model for Industrial Councils. He called upon Mr. Dukes, C.B.E., the Chairman of the National Joint Industrial Council, to make a presentation to Sir David on behalf of the Council. The presentation took the form of a handsome clock, bearing the following inscription:

> "Presented to Sir David Milne-Watson, Bart., LL.D., D.L., by the National Joint Industrial Council for the Gas Industry as a mark of sincere appreciation of his outstanding achievements while Chairman of the Council for 25 years."

Mr. DUKES referred in felicitous terms to Sir David's great services to the Council, and stressed in particular his readiness to consider the point of view of the employees. He also referred to the fact that the period of Sir David's Chairmanship had been one of many difficulties, and he believed that the country was now facing a position as critical as that with which it was confronted in 1919. The men who were returning from the War had been led to expect that a new world would be created for them, whereas the new world could only be made by individual effort and harmonious working. No more could be taken out of the "kitty" than was in it. He thought that there were great potentialities for improvements in the new age. It might well be, however, that the more hastily the new plans were conceived the more illusory they might be. The new world would not be created at Westminster. He felt that most post-war planning which usually presupposed a uniform basis could not be made applicable to the various problems with which the country was faced, although he realized that certain things had got to be completed within a limited space of time, and he thought that work such as that accomplished by their Council under the Chairmanship of Sir David was a monumental effort, and he had heard of no suggestions which could be regarded as an improvement upon voluntary negotiating machinery as a means of establishing satisfactory joint relationships between employers on the one side and the workpeople on the other.

He asked Sir David to accept the clock as a symbol of his work and service to the Council, and as a token of the personal friendship which existed between him and all their members. When he (Sir David) looked at the clock in his own home it would serve to remind him of the experiences which he had undergone during the years that he had served the Council and as a measure of their gratitude and affection. They in their turn would always remember Sir David and the help he had given to them in the difficult problems which had presented themselves. Mr. Dukes concluded by wishing Sir David every happiness and a long and pleasurable retirement.

Sir DAVID, in reply, said this was a very proud moment in his life. The Joint Industrial Council had been a major interest of his ever since the inception of the Whitley proposals. He referred to the early meetings with Alderman Will Thorne, and the fact that he had been Deputy Chairman of the Council for many years. He had now to congratulate him on the honour conferred upon him by the King of membership of the Privy Council. Sir David said he had occupied a great many positions in the Gas Industry, but he did not think he was more proud of any position than he was of being Chairman of that Council. No other important Industry in the country as far as he knew had escaped a major strike. He reminded the representatives present that they were all part and parcel of the Gas Industry, and he urged unity in the Industry in the years to come. He also reminded them that the Gas Industry by the proper and efficient carbonization of coal produced residuals which were of great benefit to the country.

He thanked the Council for their handsome present, which would be most useful, and would always remind him of the happy times he had spent as their Chairman. He was delighted to leave the work of the Council in the hands of Mr. Dukes, in whom he had complete confidence.

Dividends have been declared by the Yorktown (Camberley) and District Gas and Electricity Company in respect of the half-year to June 30 at the usual rates on the Preference stocks and at 5½% on the 5% standard consolidated Ordinary stock, less tax, payable on Aug. 1.

A Final Dividend of 5½%, making 8% for the year, is to be paid by Powell Duffryn, Ltd., whose report for the year ended March 31 shows a balance of profit for the year of £688,643. Since the close of the financial year the share capital of the Company has been increased for the purpose of the acquisition of the 10% cumulative Preference and Ordinary stock of North's Navigation Collieries (1889), Ltd. The Coal Commission has completed the purchase of the Company's interests in freehold coal, though in certain cases of wayleave rights the Company elected to repay the cash compensation in exchange for rights of free usage.

Technical Aspects of the Gas Industry's Contribution to Post-War Housing*

By L. W. ANDREW, B.A., B.Sc., A.R.I.C., E. W. B. DUNNING, B.Sc., A.R.I.C., and G. C. HOLLIDAY, B.A., Gas Light and Coke Company

Discussion

Mr. **J. E. Davis** (South Metropolitan): It has been my privilege to be in touch with the Authors during some of the discussions and experimental work which have led to the information in their Paper, and I should like to thank them and to give my personal views on what I can only call a text-book on modern domestic fuel service. It is a text-book, and it is one which approaches an old problem in a new way, and gives a new interpretation of the Gas Industry's service in the modern home. There will undoubtedly be many new features about housing in the future, but to us I suggest the most significant fact is that the fuel-using equipment is now recognized as an essential part of the home. It must be considered in relation to the design of the house at the time when those designs are prepared. It will be observed that the Authors have not considered individual appliances as odd units to be installed at some time or other in a house without regard to the planning of the fuel services as a whole. They have taken the problem as a whole, and have fitted available units together in a variety of patterns to provide excellent fuel service at minimum cost. In doing so they have developed and recorded ideas for improvements which will be desirable in future appliance design, but this forward view in no way detracts from the high standard which can be obtained with existing gas and coke appliances in a properly planned layout.

This type of work is full of pitfalls. There is an excellent illustration in Table II. The open coke fire is shown by laboratory tests to have a radiant thermal efficiency of some 27 per cent. The slow combustion stove can be shown to have a thermal efficiency of 65 per cent. Carelessly one might fall into the trap that the slow combustion stove will use less than half the fuel that the open fire will use. But the Authors of this Paper are well aware of the catch; the figures in Table II show the practical facts of the case. If a single coke appliance is to be used for space heating it is likely to consume some 30 cwt. per annum with a variation of about 5 cwt. on either side of this figure. That is a far truer picture than incautious calculations from test bench efficiencies. The truth of the matter is, of course, that practical efficiency turns, not upon the total output of heat or total output of hot water, but upon that quantity which is needed and can be usefully employed. With such an appliance installed an adequate hot water supply can be obtained according to the period of the year in which it is used for the expenditure of a further 5 to 10 cwt. in addition to the 30 cwt. used for heating, and clearly this is an extremely economical way of providing the hot water service so long as space heating by solid fuel is required. The form of solid fuel appliance and its probable method of use through the heating system set the pattern of winter water heating, and the pattern is completed by the selection of appropriate gas appliances to supplement the service in the winter and to take on full duty in the summer months. It is this interlocking of services that makes it inappropriate to select one particular appliance and take it away from its context of usage.

The series of tables accompanying the house plans are most valuable, but I am sure the Authors would not wish to interpret each of the figures in those tables as being the fixed and invariable truth. They are there for guidance, and very good guidance, but it is necessary in computations of this nature to avoid the assumption of precision where precision is impossible. I know the Authors are well aware of this danger, and I hope that those many people who will use this Paper as a guide in the planning of domestic installations will also be alert to the same point. There are a great many things one would like to say on this Paper but time is short, and I shall hope to have other opportunities of discussing them with the Authors. May I express the view that this statement of modern practice in no way precludes the possibility of further improvements yet to come. There is still a lot to be learned about the heating of homes, but I am confident that just as gas and coke can give the finest service judged by modern standards, so will they continue to lead as our understanding of the problem increases.

Dr. **Harold Hartley** (Vice-President): The Authors have increased the indebtedness of the Industry to the Gas Light and Coke Company, and especially to the staff of Watson House. The communication will be of especial interest to those engaged on the supply side, and should receive critical discussion. The field covered is so wide and has been treated in such detail that there has resulted a Paper too lengthy for adequate consideration at a meeting of the present type. It would have been better had the Authors been able to divide the subject into three parts, each dealing with a section as a subject for a separate communication. I hope arrangements will be made for this Paper to be discussed regionally throughout the country. The comments which follow are based on a somewhat hurried first perusal.

References should be given in the text to make it clear when other Authorities are being quoted. In estimating the expenditure involved in providing a heat service uncertainty must always arise owing to the underlying assumptions which have to be made. The results at the best can only be an approximation to the average, and must always be accepted with that realization. It is desirable that the Authors should add details of the thermal characteristics of the buildings with which they deal. A good point is made as to the need for ensuring that householders shall be able to take advantage of future developments in fuel-using appliances. There is rightly emphasized the need to provide fresh air inlets to living rooms. Many architects do not appreciate this. Reference is made to maintenance costs, but although this matter is of outstanding importance it is not dealt with in the Paper. In some cases to-day maintenance costs tend to make the water-heating load unremunerative.

With regard to space heating, if a coke appliance is installed it is desirable to use this for background heating. Gas fires should be used for topping-up in the bedrooms. The convector type gas fire used in the living-room in conjunction with energy taken from a coke appliance located in the kitchen offers interesting possibilities to the Gas Industry. The consumptions quoted for the open coke fire appear to relate to the 14-in. size. For the more usual 16-in. size fire they should read "1–3 lb./hr." The consumption quoted for the openable slow combustion stove is also too low. The size of stove used for the 850–1,000 sq. ft. house to provide space heating for the living-room and background heating for the bedrooms would burn 3 lb. per hour with the doors open, and more with the doors closed. The annual consumptions quoted in Table II are low. It is also optimistic to expect sufficient hot water from the appliance with a back boiler for an extra consumption of 5 cwt. of coke in 30 weeks, as compared with the fuel used in the appliance without the boiler. The same fuel consumptions are given for the open fire and the slow combustion stove, yet the latter burns continuously for 14 weeks and gives twice the amount of heat.

With regard to water heating, when space heating and water heating are obtained by means of one coke-consuming appliance the correct ratios are not maintained throughout the whole space-heating season. The distribution is usually adjusted for the average space-heating demand. More than the average hot water will be given in the coldest weather, with less than the average space heating during the milder periods. Separate appliances used for each of the loads, of course, offer greater elasticity. It is not desirable to fit a radiator on the circuit from the back boiler of an open fire, as is suggested. The Authors note some of the advantages of the gas-operated circulator as compared with the instantaneous heaters, but as already mentioned, do not deal with the question of maintenance. It is possible to manufacture gas-heated circulators requiring negligible maintenance of either the combustion chamber or of the waterways, even in hard water districts. The results quoted have been attained with a storage heater too highly powered for the duty required. Much better results could be obtained with smaller heaters and improved thermostatic control. In one of the diagrams the cold water supply to the sink heater is taken from the cold water cistern. Usually this is not regarded as acceptable practice for water which may be used for drinking purposes. For the same reason the sink heater should be designed so that foreign matter, such as dust, flies, &c., is not likely to get into the water.

With regard to cooking it is essential that the Gas Industry retains the cooking load, and more space could with advantage have been devoted to this subject. In 1942 I made reference, in Communication No. 248, to the performance to be anticipated from a self-contained coke cooker cum water heater. Appliances of this type are satisfying the cooking and water heating needs for a consumption of 1½ cwt. of coke per week, equivalent to a weekly outlay of 2s. 10d. on the basis of the charges adopted by the Authors. This outlay compares with 3s. 0½d. incurred for the same service. The combination coke boiler and gas cooker of course gives a better service. The electric cooker is said by some to offer price parity if the B.O.T. unit does not cost more than 1/20th therm—I regard this ratio as favourable to the electric cooker—and the pan-electric advocate dreams of winning the cooking load. Such a picture suggests a very interesting time ahead, and obviously much will depend on the ability of the appliance maker to offer radical improvement in cooker design. However, to return to the Paper, the Authors have shown an unnecessary tenderness to some of the present-day kitchen designers in refraining from comment on the built-in cooker designs shown in some of the illustrations. Such an arrangement will provide an ideal breeding-ground for vermin, and will be condemned for use in the "industrial" house after a few years' experience. The development of the Gas Industry in this country is as great and its technique is as advanced as that in any part of the world, and so far as the appliances themselves are concerned

* I.G.E. Comm. 278, presented at the Annual Meeting of the Institution of Gas Engineers, June 12–13.

it is my view that both technically and constructionally our product is better than that offered by any other nation. For the immediate future, with gas and coke available, there is no need to fear the competition which will be met in the domestic market.

Mr. Fitzmaurice (Ministry of Works): Dr. Hartley has mentioned a matter in which my Ministry is very interested. We are concerned more with the provision of houses than with the methods of heating; that is the concern of another Ministry. But we are striving to raise the standard of heat conservation in the structure of the house itself, and here we find that insistence during the war years on the idea of heat conservation in the structure of the building is beginning to get home. One gets such things as "U" values being quoted by the most surprising people, which shows that there is a consciousness on the matter of heat conservation. I am sure that it is desirable as far as possible to have insulation of the highest value that can economically be introduced with the available materials.

Dr. J. G. King (Gas Research Board): The Authors of the Paper are to be congratulated on having collected together in an accessible form a mass of information which should serve for some time as a book of reference for those interested in this difficult problem. The contribution which our Industry is making to meet higher standards of comfort is both interesting and impressive, but I find particularly intriguing those problems which underlie the choice of those higher standards. It seems to be generally agreed that the present time provides a unique opportunity to apply new techniques on a wide scale, and it does seem that it is of the greatest importance that the fundamental basis upon which this is done should be quite sound. In the ordinary small house in this country there has not been hitherto any real attempt to provide a means of keeping the general level of temperature inside the house in winter suitably above that of the surrounding atmosphere. If this is to be done now, and it does seem that it must, limitations may be imposed by the increased cost of fuel. These limitations can be reduced only in part by better thermal insulation of the house and by the improvement of the efficiency of appliances, and it is most important that every possible means should be devised which would reduce overall coal consumption whatever the form in which the fuel is applied. The actual choice of appliance will rest with the consumer, but it is imperative that gas or coke appliances shall provide the required comfort standards with a high thermal efficiency in use allied with those considerations of convenience which have high selling value.

The Authors have shown in their Paper what the Industry has already done and what it is now offering, but I feel that their work would be greatly helped if they had, as a background, a more definite scientific explanation of what constitutes a condition of comfort. In the physiological sense conditions of comfort have not been properly defined for conditions in the home, although advances have been made in relation to factory work. It does seem that a specialist research should be started as soon as possible to define this elusive feeling of comfort in exact scientific terms. If it is done there must be collaboration between the physicist and the physiologist. The Gas Research Board feel that a collaborative effort on these lines would provide the development sections in the Industry with new ideas for the obtaining of suitable conditions of comfort at maximum thermal efficiency and maximum convenience. If I might quote an example, it is found in the early work of Fishenden (Fuel Research Technical Paper 12, 1925) that while a condition of comfort was reached in a sedentary subject with the air temperature at 65° F., radiation was necessary for the same degree of comfort if the air temperature was lower, at 60, 55, and 50°, to the amounts of 40, 75, and 120 B.Th.U. per sq.ft. per hour. It is many years since the work was done, and it seems that we want amplification of it urgently to assess other factors such as nature of radiation, humidity, and rate of air change in relation to the several different conditions of living which occur in any house. With scientific information of this kind in their hands I feel sure the valuable work of Mr. Holliday and his colleagues would reach even higher levels.

Dr. F. J. Eaton (Gas Light and Coke Company): Local authorities and those charged with the task of rehousing are, as far as heat services are concerned, interested in three things: what are the running costs, what are the capital and installation costs, and what standard of comfort is obtained for that expenditure? The answers to some of these questions can be obtained from plans 1A to 1E. These show that the lowest running costs are obtained when coke provides the heavy winter demand, and is supplemented by gas for summer use and for meeting seasonal variations in winter. Thus a running cost of 5s. 9d. per week is given for an installation containing a coke fire and a coke boiler. The cost drops to 5s. 6d. when a single coke appliance of the convector open fire back boiler type is used, and is increased to 7s. 4d. when only a coke fire is installed and gas provides the hot water supply. The running costs of an all-gas service are 8s. 2d. per week. Coming now to the capital and installation charges, it is stated in the Paper that the capital costs are not widely different for any of the systems considered. I suggest this is only true when the cost is worked out on a weekly charge basis and spread over a considerable period of years. This may not be the method adopted by the local authorities, who are much more likely to take the difference in capital cost and multiply it by the number of houses built.

I have been particularly interested in the analysis of space heating requirements given in Appendix 2, in which the Authors show the wide range of heat output needed to meet the seasonal heat requirements. The need for improvement in the control of heat output of coke appliances has long been recognized, and it is a problem to which we at the Fulham laboratories have given considerable attention. In the Fulham grate we have an appliance on which the average heat output rate can be varied from about 4,500 to 8,000 B.Th.U. per hour. Our recent experimental work on domestic coke boilers has shown that by increasing the minimum fuel capacity from 0.49 to 0.6cu. ft. and improving combustion control, the minimum combustion rate has been lowered from 0.8 to 0.45 lb. per hour, while at the same time the maximum banking period has been increased from about 9 to about 16 hours. The coke consumption figures in the Paper refer to appliances giving these improved performances. Such appliances are covered by British Standard Specifications, and must be used in all State-aided housing schemes where such appliances are included in the house. The conclusion to be drawn from the Authors' investigations is that the combustion of gas and coke provides the most suitable domestic heat service for low income group houses. In Appendix 3, paragraph 4, tests on the comparative efficiencies of a small gas multipoint and an electric immersion heater show that at least for a Portal unit, gas water heating is much more efficient. On the solid fuel side coke may be replaced by other solid smokeless fuels or by coal. Anthracite and Welsh steam coals will give results comparable with those of coke, but if coal is used a considerable drop takes place in thermal efficiency. For example, our tests on a convector open fire with back boiler gave an overall efficiency of 56 per cent. with coke and 35 per cent. with household coal. These figures are confirmed in a recent publication by Dr. Davidson, who for a similar type of appliance gives 55 per cent. for coke and 40 per cent. for coal. In conclusion, although I note from the introduction that some of the results given in the Paper have been circulated, I suggest the data are so important that they should be made known both in and outside the Industry as widely as possible. Section 5 with a short introduction on the new standards of heating would form the basis of a very useful document.

Mr. L. C. C. Rayner (Ministry of Works): There has been insufficient time to follow the calculations of heat loss in detail, but it appears that they have been taken out on the basis of continuous warming. One wonders what will be the effect on the calculated results of the essentially intermittent nature of house heating. It is possible that a light prefabricated type of house might show results approaching the computed heating regime, but the heat capacity of traditional house construction may play a very considerable part in the comfort achieved. That suggests another point. To what extent is thermal capacity responsible for the free 5° shown in the calculations and shown also in the Egerton figures. About 10 years ago Dufton carried out experiments on an insulated and an uninsulated house, measuring the requirements of good constant interior temperatures with varying outside temperatures. In both cases the heat input was directly proportional to the temperature difference. Pallot has shown that in some appliances test results indicate that the same heat input was needed with zero temperature differences. Both Pallot's and Dufton's results are susceptible to certain explanation, but my point is that neither suggests something for nothing. Is it possible that in the traditional house thermal storage in such things as brick chimneys may play an important part in thermal conditions? I notice in that respect that none of the plans shown in the Paper indicates a plumbing unit, as it is termed. I frankly do not see the point of the plumbing unit, but it would have been interesting to have had the Authors' reactions to that type of combined unit. I notice that no full reference is made to the type of chimney that one would expect. One presumes that the results are intended to be on the basis of equivalent temperature, since ideally varied types of heating are used. The vexed question of ventilation is interesting. The basis of 600 cu.ft. per hour per person as mentioned in the Paper was established by American research, using body odour as the criterion. The question that presents itself to me is that of the validity of body odour, and what is the vital principle in fresh air. One can acquire comfort in stale air so long as it is in brisk movement, but there is no comfort in stale air even if one is supplied with fresh air through a tube. We need to know a lot more about ventilation, and the minimum ventilation needed may be very small indeed.

The coke appliances interest me. Their lack of flexibility is stressed, and figures are given showing a range of from just under one pound to just over two pounds, a ratio of 2 : 1, for an appliance which is completely unable to deal with the variations in our climate. The coke boiler consumption is shown as not varying with the hot water required; 350 gall. of hot water can be provided with no more coke than that required for 220 gall. Another point is the separation of the function of combined appliances. The ideal combined appliance should separate completely the jobs to be performed. The coke boiler is mentioned as suitable for heating the kitchen, but it overheats the kitchen for 22 weeks in the year. The appliance for room and water heating is still more difficult to control. A coke back boiler or some other boiler could be devised that could be added to the fire, the duty of which could be controlled. One would like to see more stress in the Paper on the insulation of housing. In America there is a pronounced swing to gas in many parts of the country owing to its flexibility and the possibility of a very low minimum output. No mention is made in the Paper of thermostatic control of the gas fire. It has always struck me that its almost infinite flexibility needed some control. One other question I would like answered if possible is

that with regard to the ideal shape of a cylinder for the stratification of hot water. One would imagine that the ideal shape would be tall. If there are optimum ratios between temperature and height it would be of great service to know them.

Mrs. **Abbott** (Women's Gas Council): I hope that the Paper will be extensively available and that it will not only be read by the already informed. Get it over to the people, to the women of the country. Here are just the plans they want to see; here are the details they want to know; you have realized the possibilities and the variety of choice that is available. Women are less foolish than you think. They will understand this Paper—it is a book really. If you think that an abbreviated edition would be better, give it to them, but do let them see it now while they are all eagerly planning their new homes, before the architects and the builders get to work in them. We have the goods and the women must really be told about them. Will you use your ready-made channels for spreading this news. Get it over to the women through the organizations of the Gas Industry itself. The Women's Gas Council is the liaison between the Industry and the housewife, and through our branches we are in touch with thousands of women; also we can link up with a large number of organizations, all interested in housing and home-making, such as the National Council of Women, the Women's Advisory Housing Council, the Women's Group, and the Housing Centre. The functions of a good home are warmth, good food, and cleanliness, and the Industry is able to help towards giving the country these essentials, and to raise the standard of living, and this must be made known.

I want to give a few points on some of the details in the Paper. Take cookers. Women at the present time are in favour of a continuous line appearance. It is fashionable, and women want to be in the fashion. The horizontal range type gives better working space than the eye-level type, and so will be the more popular cooker. Plan 1 seems to be a fine layout with a kitchen and dining alcove; it is better than Plans 2 and 3 as it leaves the family sitting-room free from meals. The built-in type of wash boiler is preferable, and the fixed waste is a great advantage. As regards the refrigerator, definitely this should be fixed at eye level. And may I say this—there is not enough publicity about the gas refrigerator. It is suggested in the Paper that the airing cupboard should be in the utility room. It should not be in the room where the washing is done. The disposal of garbage is very difficult in an all-gas house. One advantage of the coke boiler is that it does help you to get rid of your rubbish very successfully.

I want to ask one question, Why concentrate on the fuel needs of the people in the South of England? People in the north need a fire every day of the year, and I do not think they are given enough consideration in the Paper. Do not plan every inch of the kitchen. Women do not like their lives to be over-planned for them. There should be a Women's Gas Council in every gas undertaking in the country, and there are 30. There should be 800.

Mr. **A. Forshaw** (R. & A. Main, Ltd.): I think one of the most important things that has come up in this Paper is the necessity for insulating houses. When one considers one's own house one realizes that that is a thing that is never looked at by the English builder in the slightest particular. It is very obvious that if anything in the way of insulation can be put into the house it will cause a great saving of gas and heat, and we are the people who are going to benefit by it, because I always come back in my own mind to the fact that whatever we do we are using a fuel which is expensive. Temperature is a myth so far as housing is concerned. I have seen that many times in my own house where we have thermometers all over the place. There are days when we need a fire, although according to the thermometer it is pretty warm. I have to admit that the thermometer is no criterion of the comfort of a room. That has been common knowledge for years, and I think the late Mr. J. H. Brearley, who gave one of the first important Papers on gas fires before this Institution in 1907, made a very definite statement about the uselessness of temperature as a criterion of comfort. Another point raised by one of the speakers was the question of ventilation. My views on this matter are possibly known. I think we have made a mistake, or we have gone too far, in making ventilation go from a fire up a flue which serves two or three fires, at floor level, so that all the fresh air crosses the floor, creates a draught, and goes up the chimney. It does no ventilating, but it carries with it a great deal of the heat we need in the room. I feel the time has come, now that we have a Research Board, and a building research station, and other bodies which could help in the work, for this matter to be given a great deal more attention. The question of ventilation comes into that. The ventilation should be taken away from the room at some place where you are taking away vitiated air. One speaker has raised the question of the separation of the functions of combined appliances, and I think the general impression of those who have anything to do with combined appliances is that most of the functions which they fulfil are less well done than if there was a separate appliance to do the job separately. Mrs. Abbott mentioned a point which comes under the attention of all gas appliance manufacturers, and that is the difference in conditions between north and south in this country. It makes a tremendous difference not only in the amount of heat you need to warm a house, but there are also local differences in the way people cook their food and differences in the food they use. Our friends at Watson House will admit that they are designing their appliances or making their contribution to this subject on the basis of work done in the south and the requirements of houses in the south of England, and of course that is where those people in the north do not get as much benefit from it as do the people in the south. I would like to mention one point on the matter of comfort, and that is the fact that in America, where they go in for temperatures of 75° in the rooms they use, they wear lighter clothing both in summer and winter. When they want to go outside where the temperature is lower they put on heavy clothing. Is it not a fact that in the small type of property with which this Paper is mainly concerned a good deal of heating work is not done because the people wear heavier clothing. If you start to heat up their houses they will begin to wear lighter clothing. and if they do that it means they must have more heating in their houses.

Mr. **Holliday**: With regard to the maintenance costs which Dr. Hartley mentioned, the difficulty about giving any figures at the moment is that we are all very hopeful that there will be reductions in the price of gas appliances after the war. A great deal of work is being directed to reductions in those costs. With regard to the building-in of these appliances, we are well aware of the possibilities with regard to vermin and so on. With regard to insulation, we are glad to hear that it is being taken seriously at last, as it does mean a great contribution to the further use of the more flexible fuels. With regard to Dr. King's contribution, we are thoroughly in agreement with him that a great deal more work is required on comfort conditions. Dr. Eaton has referred to capital costs and some of the other speakers to maintenance costs. It is difficult to give exact prices for post-war appliances during this change-over period. I would like to mention that we worked out several costs for Northolt, giving different combinations of fuel, and it was remarkable how closely they came out for the different combinations of fuel. We were very surprised ourselves. Mr. Rayner has shown us that the thermostatic control of gas fires would be very desirable. With regard to ventilation, his own Ministry has prepared codes requiring a certain minimum ventilation, and it is safest in our present knowledge to stick to these recommendations until we know a great deal more about these matters. Some well-ventilated rooms have an air change of as low as 0.04. With regard to the intermittency of heating which he mentioned, our calculations were based on so many hours in one room and so many in another.

Gas on New Housing Estate

Gas mains are being laid by the East Hull Gas Company to the Kingston-upon-Hull Corporation housing estate at Bilton Grange, Hull, for the purpose of giving a gas supply to 129 of the Government E.M.F. houses. These houses will use gas for cooking, washing, and refrigeration.

As the Bilton Grange estate had only been partially developed, it was necessary for the Gas Company considerably to extend its mains to give the supply, involving the laying of approximately 290, 320, and 280 yards of 12 in., 6 in., and 4 in. cast-iron main pipe. As will be seen from the photograph, the Company obtained the services of a Priestman excavator with Teredo trench shovel for gas and water mains, which enabled the Company to complete the laying of the gas mains in less than schedule time in spite of the acute man-power shortage. Several of the E.M.F. houses are seen in the background.

Lack of Staff will prevent full street lighting at Torquay. Of the 2,650 lamps in use before the war, only 1,055 were operated by time switches. The remainder were lighted by 27 lamp-lighters, and at present only six of these men are available. The Town Council has referred to committee a suggestion that the remaining lamps should be attended to by the old street fire parties.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

The Production at Gas-Works of Coke for Mobile Gas Producers*

Part I.—Factors Affecting the Manufacture of Reactive Coke at Gas-Works

By H. D. GREENWOOD, M.Sc., A.R.I.C., A.M.I.Chem. E., and
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THE purpose of this Paper is to record certain work which has been carried out during the war in order to produce a reactive carbonized fuel for use in the type of gas producer developed by the Government for motor transport. The carbonized fuel has been prepared using the technique and carbonizing plant of the Gas Industry, and it is hoped that this account will not only record what has been done, but will stimulate interest in the manufacture of fuel of this type, and in the possible future production of coke of a higher order of reactivity and suitable for wider markets and more appliances than are normal gas-retort cokes.

The development of producer gas for motor transport in this country arose almost entirely as a war effort, stimulated by Government action, in order partly to replace immediately a certain amount of imported petrol, but mainly to establish in case of emergency an organization whereby vehicles could be converted at short notice for use with producer gas, and to provide widespread experience in industry of the special technique involved in the design, operation and maintenance of gas-driven vehicles.

Government action was first taken in 1937, when the Hartley Committee of the Mines Department developed the Government Emergency Gas Producer (H.M. Stationery Office, 1940), a machine of simple construction giving a satisfactory performance on either graded anthracite or semi-coke of specified quality. Investigations continued through technical committees of the Department, by the Henley Committee, and eventually by the Ministry of War Transport, which took over the work in 1942. From this time research and experimental work on fuels and gas producers was carried out by the Producer Gas Experimental Panel of the Directorate of Alternative Fuels of the Ministry, and the Directorate was advised by a Chemical Advisory Committee. The necessary experimental work was carried out at the Fuel Research Station of the Department of Scientific and Industrial Research, and in the Gas Industry through the medium of the Gas Research Board ; the British Coal Utilization Research Association also collaborated with Imperial Chemical Industries and the City of Birmingham Gas Department in the production of alkali-activated cokes. Other experimental work was carried out by the Gas Light and Coke Company and by the London, Midland and Scottish Railway Company, and tests of the fuels produced were made by road transport firms which are members of the corresponding Operators' Panel.

A decision was eventually taken in 1942 to convert 10,000 commercial vehicles from petrol to gas; this conversion saved a certain amount of imported fuel, but chiefly provided valuable information regarding the inherent difficulties of conversion. Throughout the investigation, special consideration was given to the supply of fuel and to the specification of the necessary properties. It was realized that supplies of suitable anthracite were limited, and that provision would have to be made for the manufacture of carbonized fuels if a large number of vehicles had to be converted. The result of the investigation has been to show that the Gas Industry could have provided, if called upon, sufficient reactive fuel to operate a considerable proportion of the road transport of the country on producer gas. In the early stages this manufacture would have involved a serious reduction in retort capacity in order to provide a fuel reactive enough for the emergency producer. When, however, this producer was modified to include the use of steam and preheated air, it became possible to use, particularly in continuous vertical retorts, carbonizing conditions only very slightly removed from those of normal practice. In order to obtain a sufficiently high reactivity in the finished fuel, however, it was necessary to carbonize only certain selected coals, and in some cases to activate the cokes with sodium carbonate. The result of the investigation of these two problems has an important bearing on the possibility of producing reactive cokes for other markets after the war.

Characteristics Required in Producer Fuels.

The properties which are necessary in a gas-producer fuel are high reactivity, suitable size grading, sufficient strength to resist abrasion, a manageable clinker, and low contents of ash, tar-producing bodies, sulphur and chlorine.

High reactivity is necessary to provide ease of ignition and the high rate of gasification required to enable a vehicle to be started from cold in 2 to 3 min. It has been shown that there is a correlation between road performance and the value for the Critical Air Blast test (B.S. Specification in press), and this C.A.B. value can therefore be used to assess the reactivity of producer fuels.

Since the active fuel bed of the Government producer, which is of cross-draught design, is only about 12 in. in depth, the size grading of the fuel is important, especially with regard to maximum and minimum sizes and to the distribution of the size grades within the range. With very high reactivity size range is less important, but as reactivity falls the range of size must be decreased to maintain the same performance, and the proportions of the intermediate sizes must be controlled. It is, for example, unsatisfactory to have too high a proportion of material close to the upper limit of size. In the crushing and grading of fuels, and even with natural grades of anthracite, it is not always practicable to proportion the sizes without wastage of material, and in manufacture there must always be a compromise between grading and reactivity. In the case of anthracite, it has been found that a wider size range—*e.g.*, 1½ in. to ¼ in.—may be permitted if the anthracite is activated with sodium carbonate. With coke, however, the upper limit permissible has proved to be 1 in.; if unactivated, the limit (at a C.A.B. value of 0.04) is probably ¾ in. The adoption of a wide size range and a higher upper limit of size increases the yield of graded fuel, and in practice an upper limit of 1 in. was allowed in the case of unactivated cokes, although at some sacrifice of performance in the producer. The grading which gave a satisfactory performance in long and medium distance work was: 1 to ¾ in., less than 10%; ¾ to ½ in., 30 to 40%; ½ to ¼ in., 30 to 40%; under ¼ in., 5 to 10%.

In the Government producer the space below the tuyeres is small, and the amount of clinker permissible cannot therefore be large. For the same reason the amount of ash in the fuel, and particularly its fusion temperature, must be small. In view of the fact that the ash content of carbonized fuels depends on the ash content of the coal used in their preparation, and that improved coal cleaning could not be obtained, producer vehicles have been operated with coke containing up to 12% ash, and fairly satisfactory methods of removal of ashes have been devised. Anthracite, however, is unsuitable if it contains more than 4½% ash.

The importance of a low content of tar-producing bodies is mainly in the avoidance of trouble arising from the deposition of tar in pipes and filters. The maximum amount of tar which a fuel can produce under any circumstances has been termed its "potential tar" content, and experience has shown what content may be permitted in different fuels. It follows, of course, that the fuel should be uniformly carbonized, and that no part of it should contain more than the permitted limit.

As a result of the early work on the Government Emergency Producer, and that of B.C.U.R.A., the following provisional specification limits were laid down for producer fuels:

	Anthracite.	L.T. Coke.	Activated H.T. Coke.
C.A.B. value	—	—	0.04 to 0.045
Size, in.	¾ to $\frac{3}{16}$	¾ to $\frac{3}{16}$	¾ to $\frac{3}{16}$
Ash, per cent. (maximum)	4	5	7
Potential tar, oz. per ton (maximum) ...	15	10	10

Subsequently, when the emergency producer was modified from dry-blast to use steam and preheated air, tests were carried out with unactivated high-temperature cokes which showed that, while there was always an advantage to be gained with activation, satisfactory vehicle operation was possible with unactivated coke, except under special conditions which involved frequent stopping and re-starting, provided the C.A.B. value was 0.05 or less and that the other characteristics were in accordance with the above specification.

Sources of Producer Fuel.

(a) *Existing Sources.*

As stated above, the properties essential in a good producer fuel are high reactivity, suitable size grading and strength, a manageable clinker, and low contents of ash, tar-producing bodies, sulphur and chlorine.

Such properties are readily available in hard wood charcoals which have been uniformly carbonized till they contain less than 12% of volatile matter. In Great Britain, however, the quantity of suitable wood available for making charcoal would not justify the effort

* From Communication No. 281 of The Institution of Gas Engineers' Annual Meeting, June 12-13.

necessary to organize production. On the Continent, where some half million gas producers are in operation, charcoal and wood constitute the bulk of the fuel used.

In the course of the work carried out with the emergency producer it was established at an early stage that crushed and graded anthracites of low ash content (less than 4%), which on distillation showed less than 15 oz. of potential tar per ton, were satisfactory producer fuels.

Among South Wales anthracites, reactivity decreases with decreasing hydrogen content; less than 3.1% hydrogen, representing about 6% of volatile matter, probably represents the lowest limit of reactivity. As the hydrogen content increases the amount of potential tar also increases, and accelerates rapidly just above 3.5% hydrogen, or 8% volatile matter. There is therefore only a narrow band, in this anthracite class, of coals suitable for direct consumption in the gas producer, and some of this is ruled out by high ash content, fusibility of ash, or undue friability.

Scottish anthracites, having been formed by igneous intrusion, differ in their properties from those of South Wales. These have again been found to be insufficiently reactive when selected within the limits of potential tar content. Since these coals also tend to vary rapidly over short distances in the seam, and their selection to specification would therefore be difficult, they cannot be regarded as satisfactory for use as producer fuel.

Anthracite was first considered in the Government Gas Producer Scheme because 200,000 to 250,000 tons could be obtained from South Wales without dislocation of existing allocations of supplies to industry in this country. A larger tonnage, up to 500,000 tons, of suitable anthracite could have been obtained, but this would have involved replacing the fuel used by important industries, and would also have been wasteful and uneconomic in that it would have necessitated additional crushing, thereby producing excess of anthracite duff. It was therefore necessary to find some other source of producer fuel.

The obvious alternatives to a natural fuel of low tar content such as anthracite were carbonized fuels, the coal carbonized being chosen to yield a strong coke of sufficiently high reactivity. The conditions of preparation therefore involved the choice of a coal known to give reactive coke, and as low a temperature of carbonization as was compatible with a reasonable output. "Low-temperature" coke proved a very satisfactory fuel provided the conditions of carbonization were carefully controlled to ensure uniformity of volatile matter in the coke: it was not sufficient that the average potential tar content of the coke should be within the specification. The quantity of low-temperature coke available, however, was insufficient to form the basis of a large-scale conversion scheme, and attention was directed to the possible use of medium and high temperature cokes.

(b) *Influence of the Properties of the Coal.*

The main considerations in the choice of coal for carbonization for this purpose are caking power and volatile matter content. If the caking power of British coals is plotted against volatile matter or carbon content, a curve is obtained* which shows a rapid increase of caking power starting about the point—carbon 82%, volatile matter 40%; reaching a maximum over the range—carbon 87 to 90%, volatile matter 25 to 35%; and decreasing slowly to zero at about 92% carbon or 10% volatile matter.

The highest yield of coke would be obtainable from coals of low volatile matter content, and these are mainly confined to South Wales. Anthracite up to 8% volatile matter gives a weak coke, and as volatile matter increases, the first sign of caking power does not appear until over 10%. Above 14% the cokes become intumescent and less reactive. Within the limits of 10 and 14% volatile matter, therefore, coals can be selected to give a high yield of coke. If the caking power is of the right order, the coke will be hard and strong, and trial has shown it to be a satisfactory producer fuel. Against the possibility of using such coals is the real difficulty of selection within such narrow limits, together with the low yield of gas of low calorific value which they would give in a carbonizing system. Carbonized briquettes, made from low-volatile duff, also provide a sufficiently reactive fuel for use in the producer, but their application is limited by the relatively small amount of duff of sufficiently low ash content (4%) available.

High-volatile coals present less difficulty in respect of choice. Their caking power changes more slowly with change of volatile matter, and there is a wide variety of commercial grades which have the desired properties. In order to achieve high reactivity in the coke, the caking power of the coal should lie between the limits of C and G_3 in the Gray-King assay scale. This level of caking power is below that normally used in gas and coke manufacture, and in order to obtain a high yield of lump coke it is necessary to grade the coal before carbonization. It has been established by experiment that any grade within the limits of 3½ and ½ in. is satisfactory; although with caking power below G it is necessary to exclude fines, above G a small proportion can be permitted, since agglomeration takes place.

Coals of this type are available in North Wales, North Staffordshire, South and West Yorkshire and Warwickshire, and particularly in the Notts and Derbyshire coal-fields, in Northumberland, and in Scotland. In some areas where the coal seam contains bands of hards (durain) sufficiently marked for commercial separation the hards may come within the specification although the brights are of higher caking power. This is particularly true of South Yorkshire seams, such as the Barnsley seam. During 1941 an approximate survey was made by the Fuel Research Coal Survey officers to determine how much suitable coal was actually being marketed for normal purposes. The survey showed that as much as 12 million tons were being produced annually, of which the Gas Industry was already using over 1 million.

The production in 1941 of high-volatile coals of caking power C to G_1 is given below:

Area.	Caking Power.	Million tons.
North Wales	Mainly G to G_2	0.2
North Staffs	C/D to G_2	1.0
South Yorks	C/D to G_2	1.9
West Yorks	C/D to G_2	1.2
Warwick	C/D to G	1.1
South Staffs	C/D to G	0.2
Cannock	C/D to G	0.5
Northumberland	C/D to G_1	0.5
Lancashire	G to G_2	0.6
Notts and Derby	Mainly below G	4.5
Scotland	Mainly below G	1.2
		12.9

In other years the quantities would certainly differ, but the obvious conclusion was that there was more than enough of the right type and grade of coal if it were necessary to manufacture producer fuel in bulk.

Most of the knowledge relating to those properties of coal was already available at the Fuel Research Station, but the treatment of the coal grades to give the best results for producer purposes required further experiment, particularly with regard to the yields of sized coke to be obtained, and to the actual performance in the producer of cokes made from these selected coals by different methods of carbonization.

(c) *Production of Medium-Temperature Reactive Coke.*

It was known that the reactivity of coke increased with decreasing carbonizing temperature, and also, in general, with a decrease in the caking power of coal within the bituminous range. Further, H. H. Thomas and P. J. Askey* had shown that the reactivity of coke could be increased by the addition of lime and sodium carbonate to coal before carbonization, or of sodium carbonate to the resulting coke. From prior knowledge of the relative combustibilities of cokes, it was also realized that the suitability of carbonizing plants available in the Gas Industry for making such cokes would be, in descending order, (*a*) continuous vertical retorts, (*b*) intermittent vertical chambers, and (*c*) horizontal retorts.

As a first step, and in order to avoid the difficulty of activation, it was decided to examine the effect of the type of retort using the most suitable coal and the lowest permissible carbonizing temperature. Throughout this Paper the coals used are referred to by letter, but details of their origin are given in the Appendix.

Experiments with the continuous vertical retort were made at Edinburgh, using coal A, of size 3 in. to 1 in., and three ranges of temperature, (i) 1,200°C. top to 930°C. bottom, (ii) 1,100°C. top to 930°C. bottom, and (iii) 950°C. top to 750°C. bottom, the last being the lowest considered permissible with silica-lined retorts. Under the first set of conditions the rated throughput of coal was maintained, but with the other two there were progressive decreases. The cokes were crushed and sized, giving an average of 8.6 cwt. per ton of coal, or 43% of the coal carbonized, and leaving 5.8 cwt. of breeze (under ¼ in.). When tested in the Emergency Producer none of the cokes was sufficiently reactive, but even the coke from experiment (i) was as satisfactory as anthracite when activated with 1.5% of sodium carbonate.

The intermittent vertical chamber was tried at the Fuel Research Station, using coals of the same size as the coke required, and carbonizing temperatures of (i) 1,000°C. top to 850°C. bottom, for 10 hours, and (ii) 950°C. top to 750°C. bottom, for 12 hours. It was found that uniformly carbonized cokes could be obtained, and that the yield of producer fuel was 70 to 75% of the coal carbonized. The output of gas was reduced by 50% when using low-volatile coal from South Wales, and 10% with a Notts coal, as compared with the output using a normal gas coal. The fuels from both types gave a satisfactory performance in the emergency producer, although both were inferior to anthracite.

In the case of the horizontal retort the problem was rather different: a reduction of carbonizing temperature gave "green ends," and at 800°C. only the middle third of the charge was uniformly carbonized. Neither alteration of the heating or the introduction of false end-plates provided a remedy, and a further experiment was made with the collaboration of the South Metropolitan Gas Company by carbonizing graded coals in iron trays which were passed through the retort. The trays were made in two sizes to take either 56 or 112 lb. At a temperature of 900°C. the periods of carbonization were 4½ and 6¾ hours respectively, and the throughput 16 cwt. per day, or 65% of the normal output under gas-making conditions. In experiments made by the Gas Light and Coke Company trays were not used, and the temperature found necessary in order to give uniform coke was so high (1,200°C) that the coke was not sufficiently reactive. The Newcastle and Gateshead Gas Company established in similar experiments that 820°C. was the maximum temperature of operation to ensure sufficient

* King, J. G., *Fuel*, 1944, **23**, 61.

* *Trans. Inst. Gas Eng.*, 1939–40, **89**, 539.

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TABLE I.—Experiments in the Production of Medium-Temperature Coke.

Type of Retort.	Location of Experiment.	Coal.	Conditions. Temperature of Combustion Chambers, °C.	Charge.
1	2	3	4	5
Horizontal:				
23 in. × 16 in. × 20 ft.	Gas Light and Coke Company	B—1 to ¾ in.	1,200	14 ft. for 10 hr.
21 in. × 15 in. × 20 ft.	South Metropolitan Gas Company	C—1 to ⅜ in.	900	Trays, 56 lb. for 7 hr.; 112 lb. for 9 hr.
22 in. × 16 in. × 20 ft.	Cardiff	D—⅞ to ⅛ in.	900	(*a*) 14 ft. for 10 hr. (*b*) Trays, 56 lb. for 4 hr.
22 in. × 15 in. × 20 ft.	Newcastle	E—1½ to 1 in.	800	14 ft. for 16 hr.
Continuous Vertical:				
Woodall-Duckham, upward heating	Nottingham	B—3 to ¼ in.	1,000 to 750	6 tons per day, 10 to 15% steam.
Woodall-Duckham, downward heating	Edinburgh	A—3 to 1 in.	750 to 1,000	5 tons per day, 10% steam.
Glover-West	Stourport	B—3 to ¼ in.	850	—
Intermittent Vertical:				
Woodall-Duckham	Severn Valley	B—1 to ¾ in.	850 to 1,050	10 hr., steam 1½ hr.
9 ft. 9 in. × 8 to 12½ in. × 21 ft.	Weston-super-Mare	D—⅞ to ⅜ in.	900 to 1,130	10 hr., no steam.

reactivity of the coke, but that a proportion of the coke at this temperature had to be discarded because of green ends. This was borne out by experiments carried out by the Severn Valley Gas Corporation.

At this stage the Gas Research Board was invited by the Lord Henley Committee to participate in the work. As a result nine Gas Undertakings prepared producer fuels from five suitable coals selected by one of the Authors and delivered under the supervision of the Fuel Research Coal Survey Officers. Carbonization was carried out under the conditions indicated by the above experiments, as shown in Table I using all three types of retort.

The general conclusion drawn from this experimental work was that the continuous vertical retort was the most suitable apparatus in which to make producer fuel at medium temperatures, and that the make of retort, or whether upwardly- or downwardly-heated, was immaterial, although there were indications that upward heating gave greater uniformity as regards tar content. In intermittent chambers, high-volatile Midland or low-volatile South Wales coals can be used with equal success. The necessity of using iron trays with horizontal retorts made their use impracticable.

These results are included only to complete the record of the experimental work carried out, and medium-temperature coke manufacture for producer purposes was not continued.

(d) *Production of High-Temperature Reactive Coke.*

At this stage it was realized that greater flexibility in operation of the Emergency Producer would be attained if the design were modified to include the injection of preheated air and steam. One result of this was to allow the use of less reactive fuels, such as could be produced at almost normal carbonizing temperatures, provided that the coals used were selected from the range 81.5 to 83% carbon, or that the resulting coke was activated by sodium carbonate. The work carried out by the Liverpool Gas Company on the production of "Dryco" fuel had shown that by the carbonization of coals with a carbon content of 83 to 85% under normal conditions, a coke was obtained with a C.A.B. value of about 0.06, which was not reactive enough for use as producer fuel.

The possibility of making sufficiently reactive coke at normal operating temperatures was important from the point of view of the Gas Industry, since with medium-temperature operation it had been shown that the output of town gas from a given retort setting could be reduced by as much as 50%. The production of suitable coke for the modified producer, however, would involve a throughput of coal such that the output of gas per unit plant, even with special coal, would be almost that of normal practice. Full-scale trials showed that by carbonization at temperatures about 50°C. below normal temperature and increasing the throughput of coal by 15 to 20%, cokes could be prepared which before activation had a C.A.B. value of less than 0.04, which is the reactivity of the activated anthracite adopted for the Government Producer Scheme.

	Liverpool.	Birmingham.	Nottingham.	Bradford.
Coal	F and K	F	G	H
C.A.B. value ...	0.032	0.038	0.039	0.037

Experiments were therefore begun on the production of high-temperature reactive cokes, both with and without activation with alkali. Comprehensive schemes had been prepared both by the Gas Research Board and by the B.C.U.R.A./I.C.I. group for the production of activated coke for the operation of 50,000 vehicles. The work done by the Birmingham Gas Department on the activation of coke from the carbonization of special coals in Woodall-Duckham continuous vertical retorts by sodium carbonate is described in Part II of this Paper by T. F. E. Rhead and E. T. Pickering. This coke was used by a number of vehicles in both the Government Emergency Producer and the B.C.U.R.A. producer, and generally speaking very satisfactory results were obtained.

When the Government Gas Producer Scheme was under consideration, there were indications that the rapid conversion of a limited number of vehicles to producer gas might be necessary, and that supplies of fuel might be required at short notice. The experience obtained in the use of anthracite had demonstrated that the establishing of suitable distributing organizations and the provisioning of fuel depots might take a considerable time. It was now estimated that, with the highest priority available, it would be some twelve months before the first plant for the production of activated coke could be brought into use, and probably 18 months to two years before sufficient plant could be constructed and put into operation to supply fuel for 50,000 producers. It was therefore considered essential to examine alternative methods to that of activation for producing sufficiently reactive coke for use in the modified producer.

Preliminary road tests with the modified gas producer showed that satisfactory results could be obtained with unactivated coke provided that the C.A.B. value did not exceed 0.05. The cokes on which these tests were made were produced at Edinburgh and Birmingham.

Edinburgh Coke.—The retorts used were downwardly-heated Woodall-Duckham retorts of 76 in. major axis, and the combustion chamber temperatures were 1,340°C. at the top and 1,110°C. at the bottom. Steaming was maintained at the rate of 19%. The throughput of coal was 8 tons per retort per day, and neither the yield of gas nor its calorific value was lower than that obtained from the gas coals normally used at Edinburgh.

The coal used in this experiment was the same as that used in the medium-temperature experiments—*i.e.*, coal A—in the form of cubes of 2½ in. to ¾ in. The yield of graded fuel was 42% of the coal carbonized, and it contained 3.7% volatile matter, 5.4% ash, and 3½ oz. of tar per ton, and had a C.A.B. value of 0.042.

A road trial, using a 3-ton Bedford lorry, showed that the quality of the coke was very good. Performance figures are given in Table IX.

Birmingham.—At the request of the Ministry of War Transport a number of batches of unactivated coke were prepared from coal F under the conditions of carbonization shown in Table II. The coal used was in the form of washed nuts, since experience had shown that if small coal were treated some tended to run through incompletely carbonized.

(*To be continued*)

Disposal of Surplus Materials

The Minister of Works has formed a Joint Advisory Committee to determine policy and procedure for the disposal of builders' material in the hands of the Government in consultation with the industry. Representatives of the manufacturers and distributors concerned with each category or group of goods will be invited to form Trade Committees to present the views of the industry on the disposal matters with which they are concerned, and to submit recommendations to the Joint Advisory Committee.

Invitations have been issued to various associations to nominate representatives to sit on Trade Committees to deal with water, gas, and drainage goods and with builders' castings. The water, gas, and drainage group Committee will deal with asbestos, cast iron, steel or wrought iron rain water pipes and fittings, gutters and fittings, soil, flue, smoke and hot water pipes and fittings, underground pipes and fittings, gas, steam and water pipes and fittings, and gutter brackets. The builders' castings group Committee will deal with manhole covers, fresh air inlets, manhole steps, cast iron gratings, cast iron brackets, ventilators and air bricks, gulley gratings, C.I.P.E. baths, cast iron fireplaces, ranges and heating stoves, cast iron radiators, cast iron fires, sectional and domestic boilers, gas cookers, back boilers, furnace pans, and greenhouse boilers (excluding canteen types).

Glasgow Housing Department has designed a standard kitchen which will be mass produced and fitted in all Corporation housing, whether permanent or temporary. By mass production and prefabrication of complete units, the cost has been reduced to a level which permits the use of excellent components and fitments. The lay-out provides for cooking and boiling by gas, and refrigeration, ironing and lighting by electricity.

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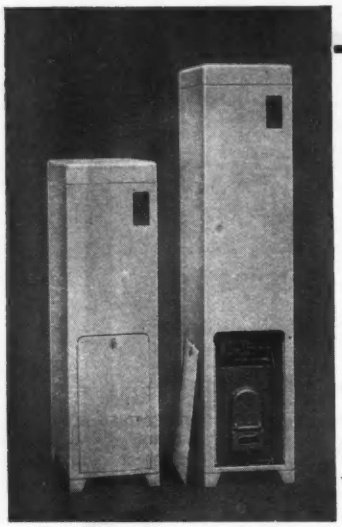

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COMPANY MEETING

Severn Valley Gas Corporation

The eleventh Ordinary General Meeting of the Severn Valley Gas Corporation, Limited, was held on July 10 at 15, Moorgate, London, E.C.

Major Julian Day, M.C. (the Chairman), who presided, said: Gentlemen, although there are only minor changes in the balance-sheet, as compared with that of the preceding year, I shall take the occasion on this, the eleventh annual meeting of the Corporation, to analyze the figures of the accounts in a manner which I hope will demonstrate the growth of the Corporation and the extent to which its aims are being achieved. In considering the facts presented, you will not be unmindful that the previous five annual general meetings were held during the stress of war in Europe, and that through all this period development has been hindered by the necessary restrictions and acute difficulties in supplies of labour and essential materials which war conditions have involved.

Holdings in Subsidiaries

On the assets side of the balance-sheet, investments in shares of subsidiary companies are shown at £1,527,794. This figure represents the actual cost of the shares of the subsidiary companies, exclusive of acquisition expenses such as compensation paid to retiring Directors, &c. Such expenses were charged to share premium account. These investments, then, stand at their net cost. They represent holdings in 26 undertakings, all but five of which are more than 90% owned and include three undertakings purchased from public authorities.

At the time of the purchase of these investments the aggregate capital expenditure of the undertakings comprising the group was equal to £701 per 1,000,000 cu.ft. of gas sold. To-day, however, owing to the increased output achieved at relatively low capital cost, such aggregate expenditure has been reduced to £477 per 1,000,000 cu. ft. of gas sold. To those familiar with statistics in the Gas Industry this low figure, applying to a group of 26 companies of which a number are small undertakings, is impressive.

At the date of acquisition of these undertakings total sales of gas were 2,749,000,000 cu.ft. The total sales to-day of the same undertakings amount to 5,398,000,000 cu.ft.—very nearly double. I need hardly emphasize that to-day's value of our investments in subsidiary companies must considerably exceed the balance-sheet figure.

Other investments at cost stand at £44,000. These investments represent minority holdings in companies whose operations are ancillary to the Gas Industry and of value to the operations of the group. Other items on the asset side do not call for comment.

Capital and Reserves

On the other side of the balance-sheet, our issued capital stands at £1,382,971. This is all permanent capital, for there are no Debentures and no redeemable Preference stock. Of this capital nearly £600,000 is Preference stock, £684,000 Ordinary stock, and then there is the £100,000 of Deferred stock subscribed at the time of the formation of the Corporation as a measure calculated to ensure a minimum dividend of 5% on the Ordinary stock. This Deferred stock is entitled to no dividend until the Ordinary has paid 5%, and in no circumstances can pay a dividend exceeding the Ordinary dividend by more than 1%. At present, when a 5½% dividend is being maintained on the Ordinary the Deferred receives 6%.

Although it is our policy to build up reserves in the operating undertakings rather than in the parent company, it is convenient to maintain at least minimum reserves in the parent company. These are provided by the balance remaining of share premium account—nearly £11,000—and a reserve fund which with the addition of £5,000 provided in this year's accounts now stands at £10,000. There is also the balance carried forward in the revenue account of £26,245, sufficient in itself to cover the net amount required for the Preferred dividend for about two years.

Loans and deposits from subsidiary companies and others stand at £141,000, against which may be set the amounts owing by subsidiary companies of about £26,000. The net liability is, therefore, approximately £115,000. This is a very strong balance-sheet, and, coupled with the substantial premium at which the Preference and Ordinary stocks are quoted, indicates that the company is in an excellent position to increase its capital to the extent required to provide for the inclusion of further undertakings in any scheme of regional integration.

I need not refer in the same detail to revenue account. Gross revenue is higher, and in the appropriation account, after provision of £5,000 to the reserve fund and providing for dividends at the rates paid since 1938, the amount carried forward is increased by £2,365.

Growth of Gas Sales

I have already referred to the great growth in sales of gas. Compared with the last pre-war year, the increase amounts to 78% and must, of course, be attributed largely to war conditions. During the current year, and more particularly during the calendar year 1946, it will be possible to judge to what extent this very substantial growth can be maintained under conditions of peace. The degree to which it can be maintained will depend largely on the relative charge for gas as compared with competitive fuels.

In some areas there is strong indication that the full war-time requirements will be demanded in the future, and thus there is foundation for the belief that present outputs can be substantially maintained. One reason giving rise to this belief is that the average price of gas throughout the group up to the close of 1944 has been increased by less than a halfpenny per therm as compared with the price at date of acquisition. This represents an increase of less than 4%, whereas since 1939 the average price paid for coal has increased by some 60%. Furthermore, the use of gas in substitution for solid fuel in both the household and the factory effects economy in labour costs, which have risen so sharply.

The relative stability in the price of gas may be accounted for to some extent by the policy pursued of concentrating the manufacture of gas so far as possible to works which produce not less than 250,000,000 cu. ft. per annum. This has been one of our primary objectives from the date of formation, and considerably greater progress in this respect would have been achieved by this date had it not been for the restrictions which conditions imposed during the past five years or longer.

By closing down small works in this group we have raised the average make per million cu.ft. of gas of the constituent undertakings, many of which you must recall are small undertakings, from about 96,000,000 cu.ft. per works in 1935 to an average of over 240,000,000 cu.ft. per works in 1944. Thus production has become more economical. Added to this is the increased consumption per consumer, which throughout the group has risen by 69%, and this figure is of primary importance in the maintenance of low charges for gas.

An Achievement of Private Enterprise

To achieve the results which I have indicated has involved large expenditure. This has been required in developing and improving works, laying new and larger mains and providing additional gasholders, for all of which developments the expenditure of our constituent companies has reached a figure not far short of £1,000,000 since acquisition. Yet, as I have said, the expenditure on capital account of these companies is substantially lower in proportion to output, and any funds required have been obtained on very favourable terms.

I think that we may fairly claim that the record of growth and development which I have so briefly summarized, and which has been brought about during a period when so many restrictions have prevailed, may be regarded as one out of many examples which tend to warrant the continuance of private enterprise in the Gas Industry. Such very concrete achievements are a strong argument against the imposition of the wholly experimental project of national ownership.

In conclusion I wish to express our sincere appreciation of the loyalty and co-operation which we have received from all officials, staff and employees throughout the organization, and to express the hope that we may soon welcome back those who have been serving the nation in H.M. Forces when they can be released from service.

The report and accounts were adopted.

Selecting Post-War Houses

A Committee of nine men and women, representing the architectural profession, the building industry, and the working housewife, will meet in London next week to select, from the many plans submitted, 30 from which houses of the English traditional type will be built. These plans, which are architect-designed, have been submitted by Registered House-Builders in a competition organized by the House-Building Industries' Standing Committee. The plans will previously have been assessed by Group Area Committees, who will have judged the plans in relation to local geographical and social needs, and by the Ministry of Works, which will grade them on structural quality.

With the recommendations of these Committees before them, the final Committee will have the onerous task of choosing the plans which will demonstrate to the nation what the house-building and the big allied industries have to offer in the new traditional type of house—the first that have been built since 1939.

It is hoped that the names of the builders whose plans are finally selected will be announced early in August, and that building of the houses will commence towards the end of the month. When selected, the plans will be put on exhibition in London, where criticisms from the public will be invited.

A New Benzole Rectification Plant installed at the Etruria works of the Stoke-on-Trent Gas Department was inaugurated on July 2. The plant, designed and constructed by W. C. Holmes & Co., Ltd., is specially designed to deal with crude benzole from continuous vertical retorts. The inauguration ceremony was performed by Alderman G. H. Barber, and a large number of visitors were afterwards entertained to tea in the works canteen.

GAS PRODUCTS PRICES—STOCKS AND SHARES

The London Market July 16.

There are no changes to report in the prices of Coal Tar Products.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

The only change to report in connexion with the prices of Coal Tar Products is the coming into effect on June 11 of a new Government Order increasing the prices of Coal Tar Spirits. This Order is entitled the Control of Benzole and Coal Spirit Order, 1945 (S. R. & O. 1945, No. 681).

Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

The Provinces July 16.

The average prices of gas-works products during the week were : Pitch and Crude Tar,* Toluole, naked, North, 90's. 2s. 4d. to 2s. 6½d., pure, 3s. 2½d. (now controlled by S. R. & O. 1945, No. 681), operative from June 11, 1945. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1945, dated June 1, 1945, S. R. & O. 1945, No. 681, operative from June 11, 1945. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland July 14.

Steady conditions continue to prevail. Refined tar*: Yield to Distillers is 5d. per gallon *ex* Works, naked. Creosote oil : Timber preserving quality,* 5½d. to 6½d. ; hydrogenation oil,* 5⅞d. ; low gravity or virgin oil,† 7¼d. to 7½d. ; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha† : 7d. to 8d. per gallon. Solvent naphtha* : Basic prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0½d. ; Rectified, 2s. 4d. per gallon. Pyridine† : 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

The rise in prices which was so noticeable during the election came to an end last week. The previous confidence in the forecasts of the General Election lessened, and it is apparent that investors are awaiting the actual results before opening further commitments. The number of markings was less each day compared with the previous week, but the tone generally remained firm.

The volume of business in the Gas Market, although small, was about on a par with that of last week, and prices with few exceptions closed firm. It will be seen that in addition to their ordinary units several Gas Light fixed-interest stocks closed fractionally higher, and on the Liverpool Exchange some price adjustments took place between the two Preston stocks, the "A" moving up 15 points and the "B" reaching 16. At Newcastle Sunderland ordinary gained 3 points.

The following were the price movements during the week :

PROVINCIAL EXCHANGES

Preston "A"	185—190	+15	
" "B"	115—120	−16	
Sunderland Ord.	124—126	+3	
Weston-super-Mare 4 p.c. Deb. (*x.d.*)	99—101	July 2	
Ditto 7½ p.c. Deb. (*x.d.*)	145—150	"	

OFFICIAL LIST

Bombay Ord.	42/—45/-	+1/-
Commercial	62—67	−1
Gas Light Units	22/6—23/6	+-/3d.
Ditto 4 p.c. Pref.	103—106	+½
Ditto 3½ p.c. Red. Pref.	102—105	+½
Ditto 3 p.c. Deb.	89—92	+½
Primitiva Holdings, Ltd. (*x.d.*)	12/—13/-	July 9
South-Eastern Gas Corporation Ord.	21/9—22/9	−-/3d.
South Metropolitan 6 p.c. Pref.	128—133	+1

SUPPLEMENTARY LIST

Reading 4 p.c. Deb.	98—103	+1

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FOR SALE.—About 70 new Fireclay "D" Retorts, 22 in. by 16 in. by 21 ft. long, in three sections. Not now required owing to dismantling. Reply, No. 9446, "GAS JOURNAL," 51, High Street, Esher, Surrey.

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Applications to J. Hunter Rioch, Managing Director and Secretary, The Cambridge University and Town Gas Light Company, 52, Sidney Street, Cambridge.

FOR SALE.—Static Ammonia Six-bay WASHER, capacity ¾ million cu.ft. per day, 18 in. Valves and Connexions. Electric driven.

Enquiries to Engineer and Manager, Rutland Street, Ilkeston.

CONTRACTS OPEN

CITY OF MANCHESTER

THE Gas Committee invites Tenders for the Purchase and Removal from site of a STEAM LOCOMOTIVE from the Rochdale Road Gas Works.

Forms of Tender may be obtained on application to Mr. J. H. Cadman, Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed Tenders in the envelope provided, addressed to the Chairman of the Gas Committee, endorsed "Tender for Steam Locomotive," must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 10 a.m. on Monday, July 30, 1945.

The Gas Committee does not bind itself to accept the highest or any Tender.

Town Hall, Manchester, 2. July, 1945.

PHILIP B. DINGLE, Town Clerk.

THE Severn Valley Gas Corporation, Ltd., invite TENDERS for a HIGH PRESSURE GASHOLDER for the Monmouth Gas-Works, to store 50,000 cu.ft. at 60 lb. per sq.in. Higher pressures for the same quantity would be considered. The vessel can be of any shape to suit the builders. It will have to conform to requirements of the Engineering Insurance Companies. Enquiries are also invited for suitable COMPRESSING PLANT of 5,000-10,000 cu.ft. per hour. Electricity supply: 400 v., 3 ph., 50 cycles.

Queries respecting the above can be addressed to the Severn Valley Gas Corporation, Ltd., Gas-Works, Cheltenham, or to A. E. Pask, Engineer, The Gas-Works, Monmouth.

COUNTY BOROUGH OF DARLINGTON

(GAS DEPARTMENT)

TENDERS are invited by the above for the Supply, Delivery and Erection, at their Valley Street Works, of a 3 million cu.ft. capacity Riveted Spiral Guided Gasholder in a welded steel tank on foundations to be provided by the Corporation.

Specification, Conditions of Contract and Form of Tender may be obtained from the Gas Engineer, Mr. A. E. Ruffhead, A.M.Inst.C.E., John Street, Darlington, upon the deposit of a sum of £2 2s. This deposit will be returned upon the receipt of a bona-fide Tender.

Tenders in a plain sealed envelope, endorsed "Tender for Gasholder," to be delivered to the undersigned not later than Thursday, August 9, 1945.

11, Houndgate, Darlington. July 7, 1945.

H. HOPKINS, Town Clerk.

THE HONITON GAS & COKE COMPANY, LTD

TENDERS are invited for excavating and laying approximately 400 yards of 8 in. Cast Iron Gas Mains and Specials and 600 yards of 6 in. ditto. Particulars can be obtained from the undersigned. Tenders to be delivered by July 25. The lowest or any Tender will not necessarily be accepted.

(Signed) F. J. WORTHINGTON, Manager and Director.

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ENGINEER and Manager (44) desires change thoroughly experienced in Manufacture and Distribution in Works up to 50 million (Vertical or Horizontal). Excellent references.
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APPOINTMENTS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

APPLICANTS for the post of ASSISTANT ENGINEER AND MANAGER to the Bombay Gas Company, Limited, are hereby THANKED and informed that the APPOINTMENT HAS BEEN FILLED.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

THE LIVERPOOL GAS COMPANY

MAINS SUPERVISOR

APPLICATIONS are invited for a Position of DISTRICT MAINS SUPERVISOR in the Distributing Department of The Liverpool Gas Company. Applicants should not be more than 45 years of age and should have a sound technical and practical training on all aspects of gas distributing problems, with particular reference to mains, services, low and high pressure gas, district governor operation and maintenance.

Application forms may be obtained by writing to the Personnel Superintendent, Radiant House, Bold Street, Liverpool, 1, and should be returned to him on or before July 31, 1945.

The Salary would be £400 per annum inclusive of the current cost of living bonus, and the successful applicant would be required to pass the usual pre-employment medical examination, and would be admissible to the Officials' Superannuation Fund.

GUERNSEY GAS LIGHT COMPANY LIMITED

APPLICATIONS are invited for the appointment of ASSISTANT MANAGER to the above Undertaking, at a commencing Salary of £400 rising, according to ability, to £500 per annum.

Applicants must have had experience in a Gas-Works of approximately similar size, and be familiar with Horizontal Retort practice, mechanical stoking and handling plant, and either C.W.G. or B.W.G. Plants, and be capable of acting as Deputy to the undersigned during his absence.

Applicants must be Associate Members of the Institution of Gas Engineers, or be prepared to qualify as such.

Applications, stating Age, Experience and Qualifications, together with *copies* only of three recent Testimonials, should reach the undersigned not later than August 1, 1945.

16, Smith Street, Guernsey. — R. G. LUXON, Engineer, Manager and Secretary.
July 2, 1945.

CITY AND ROYAL BURGH OF EDINBURGH

(GAS DEPARTMENT)

SALES SUPERINTENDENT

APPLICATIONS are invited for the Position of SALES SUPERINTENDENT with the above Undertaking.

Applicants must be of good education and address and be suitably qualified by training and experience. In addition to the organization and control of showroom and sales staffs, the superintendent is responsible for the development of industrial commercial and domestic sales.

The remuneration will be £550, rising to £650 per annum plus bonus, which is at present £60.

The appointment will be subject to the Corporation Superannuation Scheme.

Applications, stating Age, Experience and Qualifications and also the position in relation to the Essential Works Order, together with *copies* of recent Testimonials, should be lodged with the undersigned not later than the first post on Saturday, July 28, 1945.

15, Calton Hill, Edinburgh, 1. — JAMES JAMIESON, Engineer and Manager.

KELTY GAS COMPANY, LTD.

APPLICATIONS are invited for the Position of MANAGER. Make 85 million cu.ft.

Salary £400 per annum (including War Bonus), rising by annual increments of £25 to a maximum of £475, with free house (first-class bungalow), rates, fuel and light.

Applications, stating Age, Experience, &c., with *copies* of Testimonials to be lodged with the undersigned by July 31.

26, Viewfield Terrace, Dunfermline. — D. M. WILSON, Secretary.

THE SHREWSBURY GAS LIGHT COMPANY

APPLICATIONS are invited for the Position of TECHNICAL ASSISTANT at the Shrewsbury Gas-Works. Candidates should have practical experience in the operation of Gas-Works Plant, particularly W.D. Vertical Retorts, and should also have experience in practical Gas-Works Chemistry.

Commencing salary £300 per annum plus War Allowances.

Applications, with full details of Qualifications, should reach the undersigned not later than Saturday, July 28, 1945.

Gas-Works, Shrewsbury. — C. M. D. BELTON, Engineer and Manager.

WANTED.—Experienced GASFITTER, who should have a knowledge of fixing Water Heating apparatus. A knowledge of fixing gas-fired Central Heating installations is also desirable.

Standard rate of wages 1s. 9½d. per hour for 47 hours per week, plus out allowance of 10s. 6d. per week.

The position is permanent for a suitable man.

Apply in writing to The Engineer and Manager, The Conway Gas Company, Ltd., Castle Street, Conway.
June 25, 1945.

Permission has been given by the Min stry of Labour and National Service for the publication of this advertisement.

CITY OF BIRMINGHAM

(GAS DEPARTMENT)

ASSISTANT SUPERINTENDENT, INDUSTRIAL HEATING SECTION, INDUSTRIAL RESEARCH LABORATORIES

APPLICATIONS are invited for the position of ASSISTANT SUPERINTENDENT, INDUSTRIAL HEATING SECTION, at a Salary of £550 per annum, rising, subject to satisfactory service, to £750 per annum, plus War Bonus at present amounting to £56 1s. per annum.

The duties of the post require knowledge of planning, layout, installation and maintenance of industrial gas furnace plant, and sound practical training in mechanical engineering.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications, stating Age, Qualifications and Experience together with the names of three persons from whom references can be obtained, also information as to the candidate's position in relation to the Essential Works (General Provisions) Order and Military Service, should be addressed to the undersigned to arrive not later than August 11, 1945.

The Council House, Birmingham, 3. — ALEX. W. LEE, General Manager and Secretary.
July 13, 1945.

BRIGHTON, HOVE & WORTHING GAS COMPANY

POSITION OF GENERAL MANAGER

APPLICATIONS are invited for the appointment of GENERAL MANAGER to the above undertaking at a commencing salary of £1,600 per annum. Candidates should be not more than 45 years of age, and must possess high administrative capabilities. Conversancy with the technical conduct of a Gas Undertaking preferable, but not essential.

Applications, stating Age, Experience and Qualifications, to be accompanied by a recent photograph, must reach the undersigned not later than August 10, 1945.

Late applications from Candidates serving abroad with H.M. Forces will receive special consideration.

5, Great Winchester Street, London, E.C. 2. — G. MURRAY BURTON, Secretary.
June 30, 1945.

WANTED.—PUBLIC LIGHTING INSPECTOR to supervise maintenance, &c., of 2,200 Public Lamps. Wage according to qualifications.

Apply, stating Age, Experience, Wage required and position under Essential Works Order to Manager, East Hull Gas Company, St. Mark Street, Hull.

(Passed to Appointments Board by Ministry of Labour and Approved.)

THE LIVERPOOL GAS COMPANY

THE Liverpool Gas Company require the services of a suitably qualified person to take charge of the inspection of stores and equipment, including gas appliances, in connection with their centralized Stores Department. Applicants should be qualified by training and experience in Physics and/or Chemistry and/or Mechanics, and should preferably be not more than 35 years of age.

The salary will be in accordance with qualifications, and would not be less than £450 per annum, inclusive of the current cost of living bonus.

The successful applicant will be required to pass the usual pre-employment medical examination, and will be admissible to the Officials' Superannuation Fund.

Applications should be made on the official form, which may be obtained by writing to the Personnel Superintendent, Radiant House, Bold Street, Liverpool, 1, and should be returned to him in order to arrive on or before July 28, 1945.

THE CITY AND ROYAL BURGH OF PERTH

SALES AND DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited from suitably qualified and experienced candidates for the above position (approximate sales per annum 650 million cu.ft.). Candidates should possess the Higher Grade Certificate of The Institution of Gas Engineers (Gas Supply) or equivalent qualifications. Salary will be paid according to qualifications and experience.

The Appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a Medical Examination.

Applications, accompanied by *copies* of recent Testimonials, stating Salary required, Age, Qualifications and Experience, Position with regard to the E.W.O. and C.E.O. should be addressed to the undersigned so as to be received on or before Saturday, July 28.

Gas-Works Offices, Friarton, Perth. — W. NICOL BAIRD, Engineer and Manager.
July 11, 1945.

DERBY GAS LIGHT & COKE COMPANY

APPOINTMENT OF SHIFT FOREMEN

APPLICATIONS are invited for the position of SHIFT FOREMEN to work on rotating shifts with intervals on day work as Deputy Yard Foremen.

Applicants should be Gas-Works trained and have had good experience in Retort House Control and Works routine, and must possess ability satisfactorily to control labour. Present wage £7 per week.

The appointment will be terminable by one month's notice on either side, and successful candidate will be required to pass a Medical Examination.

Candidates should state the period of notice required to terminate their present appointment, and position in regard to Military Service and Essential Works Order.

Applications, stating Age, Experience, and present position, and enclosing *copies* of two recent Testimonials, should be addressed to the undersigned to be received not later than August 15, 1945.

Gas Offices, Friar Gate, Derby. — C. H. MOSEDALE, Secretary.

MISCELLANEOUS

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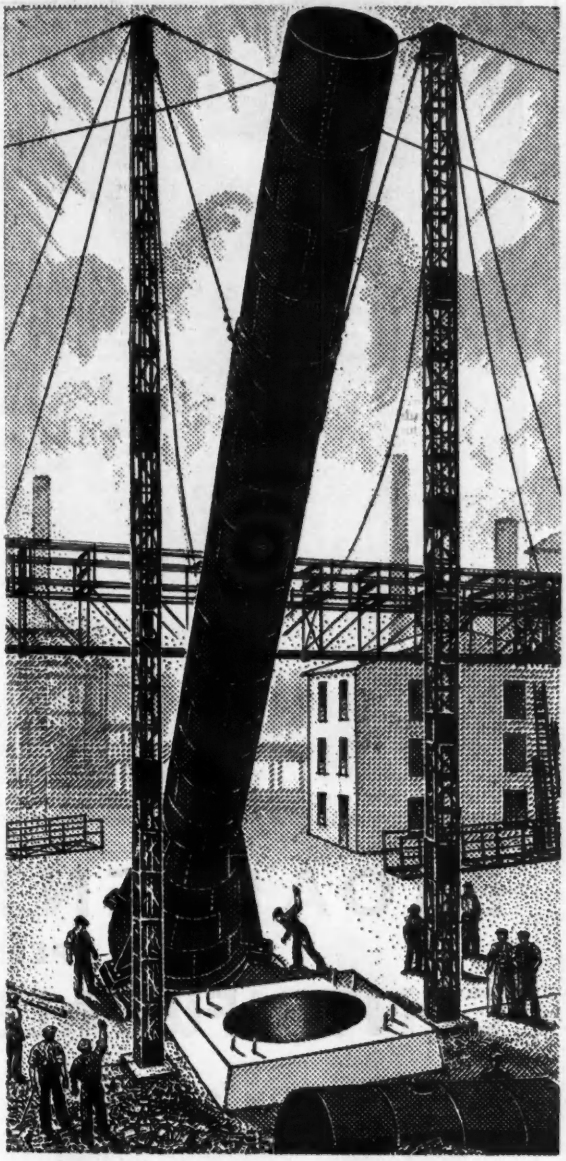

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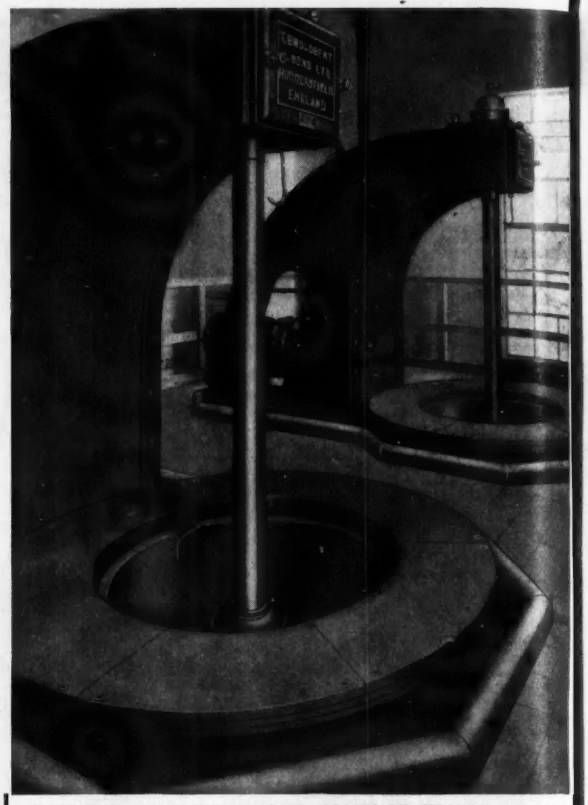

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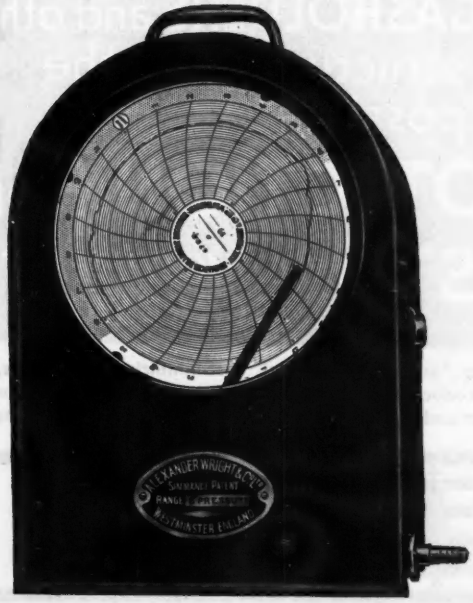

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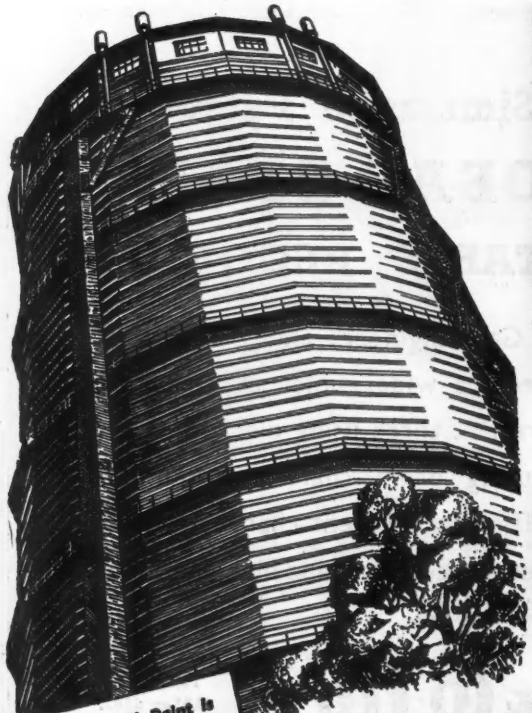

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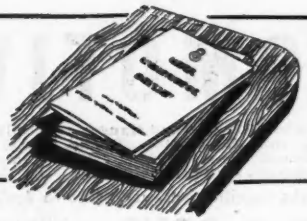
PRACTICAL ECONOMY POINTS FOR INDUSTRIAL GAS USERS
(Bulletin No. 5)

This Bulletin gives two lists of sound and easily followed hints on gas economy : one list is for management, and the other for operators. Planned production coupled with a keen fuel-watching system can produce considerable savings.

OPERATION AND MAINTENANCE OF GAS BURNERS
(Bulletin No. 14)

Every operator of a gas-burning appliance should read and re-read the hints in this Bulletin. Unless he understands the burner and its controls, he may be not only wasting gas and getting bad results, but giving himself a lot of needless trouble into the bargain.

If the recommendations in the Fuel Efficiency Bulletins are followed closely the expectation of gas economies can be based not on hope but on *certainty*. If you need extra copies for your executives or your fuel watchers or your operatives, please write or phone your Regional Office of the Ministry of Fuel and Power.



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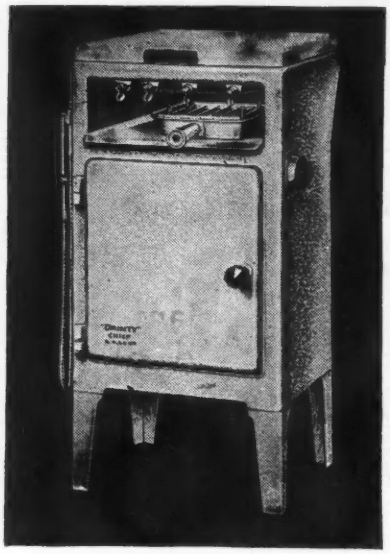

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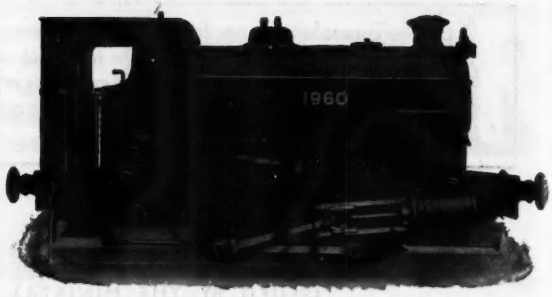

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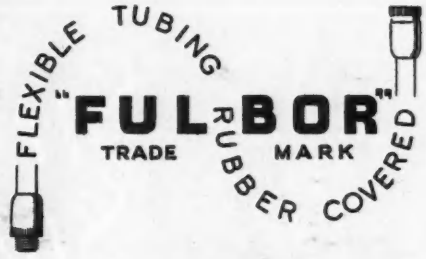

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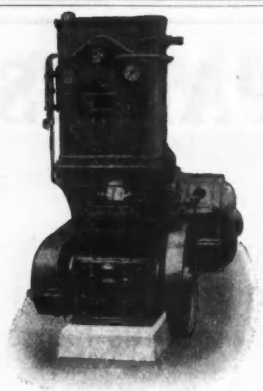

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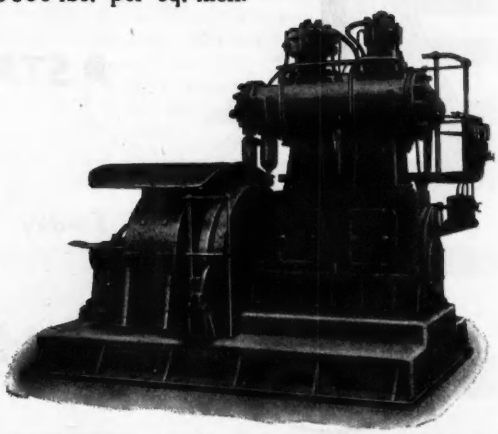

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DO YOU KNOW

how much gas was produced by authorised undertakings in the years between the 1st and 2nd world wars?

EACH **=** 10,000,000,000 cu. ft. above the first 250,000,000,000 cu. ft.

1922	
1927	
1932	
1937	

The above chart compiled from Board of Trade returns, coal-gas and water-gas, includes also coke oven gas purchased and small amounts of special types (Mond Gas, Producer Gas, etc.).

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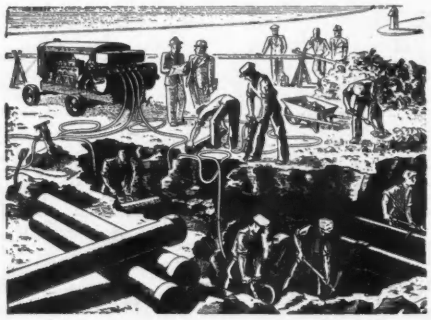

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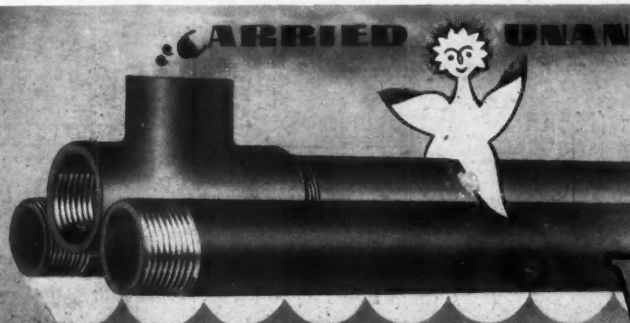

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